NASA SP-7011 (130)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 130)

JULY 1974

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series)	N74-19637 N74-21629
IAA (A-10000 Series)	A74-25632--A74-28535

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Tisco, Inc.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through July 1, 1974.

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA SP-7011 (130)		

4. Title and Subtitle	5. Report Date
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography (Supplement 130)	July 1974
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code
15. Supplementary Notes	

16. Abstract

This special bibliography lists 291 reports, articles, and other documents introduced into the NASA scientific and technical information system in June 1974.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified - Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	87	

*For sale by the National Technical Information Service, Springfield, Virginia 22151

NASA SP-7011 (130)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 130)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in June 1974 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

Scientific and Technical Information Office
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JULY 1974
Washington, D.C.

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22151 for $4.00. For copies mailed to addresses outside the United States, add $2.50 per copy for handling and postage.

ii

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 291 reports, articles and other documents announced during June 1974 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1974 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A74-10000 series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at $5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche [1] are available at the rate of $1.00 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is $1.00. Please refer to the accession number, e.g. A74-10763, when requesting publications.

STAR ENTRIES (N74-10000 Series)

A source from which a publication abstracted in this Section is available to the public is ordinarily given on the last line of the citation, e.g., Avail. NTIS. The following are the most commonly indicated sources (full addresses of these organizations are listed at the end of this introduction)

Avail: NTIS. Sold by the National Technical Information Service at the price shown in the citation. If no price is shown in a current *STAR* citation, it may be ascertained by referring to *Government Reports Announcements* or to NTIS. Beginning with documents announced in Issue 21, 1973, "stocked" reports, such as printed NASA reports are priced on a step schedule ranging irregularly from $3.00 for a 1-to-25 page report to $11.00 for 576 to 600 pages, plus $2.00 for each additional 100-page increment. Demand print reports (those for which a facsimile reproduction will be made to fill orders) are priced at $4.00 for the first 20 pages plus 25 cents for each five pages or portions thereof. These prices are not applied retroactively; i.e., reports previously announced at a certain price continue to be sold at that price. If "Avail: NTIS" without a price appeared in the citation of a NASA report (asterisked) it is sold at $3.00 whether printed copy or facsimile is supplied. Because of price changes and possible surcharges, it is recommended that for any document announced in *STAR* before July 1970, NTIS be queried as to the price. Document prices are subject to change without notice. See "Avail: SOD" below for documents available from both the Superintendent of Documents and NTIS.

Microfiche. Microfiche is available from NTIS at a standard price of $1.45 (regardless of age) for those documents identified by the # sign following the accession number (e.g., N74-10108#) and having an NTIS availability shown in the citation. Standing orders for microfiche of (1) the full collection of NTIS-available documents announced in *STAR* with the # symbol, (2) NASA reports only (identified by an asterisk (*)), (3) NASA-accessioned non-NASA reports only (for those who wish to maintain an integrated microfiche file of aerospace documents by the "N" accession number), or (4) any of these classes within one or more *STAR* categories, also may be placed with NTIS at greatly reduced prices per title (e.g., 45 cents) over individual requests. Inquiries concerning NTIS Selective Categories in Microfiche should be addressed to the Subscription Unit, National Technical Information Service.

Deposit Accounts and Customers Outside U.S. NTIS encourages its customers to open deposit accounts to facilitate the purchase of its documents now that prices vary so greatly.

NTIS customers outside the United States are reminded that they should add the following handling and postage charges to the standard or announced prices:

(1) A microfiche is a transparent sheet of film, 105 x 148 mm in size, containing up to 98 pages of information reduced to micro images (not to exceed 24:1 reduction).

hard (paper) copy, $2.50 each document; microfiche, $1.50 each document. For subscribers outside the United States who receive microfiche through the Selective Categories in Microfiche program, NTIS will add 15 cents for each title shipped.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The price is given following the availability line. (An order received by NTIS for one of these documents will be filled at the SOD price if hard copy is requested. NTIS will also fill microfiche requests, at the standard $1.45 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the Mississippi Test Facility, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: NASA Scientific and Technical Information Office. Documents with this availability are usually news releases or informational brochures available without charge in paper copy.

Avail: AEC Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of U.S. Atomic Energy Commission reports, usually in microfiche form, are listed in *Nuclear Science Abstracts*. Services available from the USAEC and its depositories are described in a booklet, *Science Information Available from the Atomic Energy Commission* (TID-4550), which may be obtained without charge from the USAEC Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts*, and are sold by University Microfilms as xerographic copy (HC) at $10.00 each and microfilm at $4.00 each, regardless of the length of the manuscript. Handling and shipping charges are additional. All requests should cite the author and the Order Number as they appear in the citation.

Avail: HMSO Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc., (PHI), Redwood City, California. The U.S. price (including a service charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown (If none is given, inquiry should be addressed to BLL).

Avail: ZLDI Sold by the Zentralstelle für Luftfahrtdokumentation und -Information, Munich, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability: Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent Office. Sold by Commissioner of Patents, U.S. Patent Office, at the standard price of $.50 each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

SUBSCRIPTION AVAILABILITY

This publication is available on subscription from the National Technical Information Service (NTIS). The annual subscription rate for the monthly supplements, excluding the annual cumulative index, is $18.75 domestic; $23.50 foreign. All questions relating to the subscriptions should be referred to NTIS.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
750 Third Ave
New York, N Y 10017

British Lending Library Division
Boston Spa, Wetherby,
Yorkshire, England

Commissioner of Patents
U S Patent Office
Washington, D C 20231

ESRO/ELDO Space Documentation Service
European Space Research Organization
114, av. Charles de Gaulle
92-Neuilly-sur-Seine, France

Her Majesty's Stationery Office
P O Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 33
College Park, Maryland 20740

National Aeronautics and Space
Administration
Scientific and Technical Information
Office (KSI)
Washington, D.C. 20546

National Technical Information Service
Springfield, Virginia 22151

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

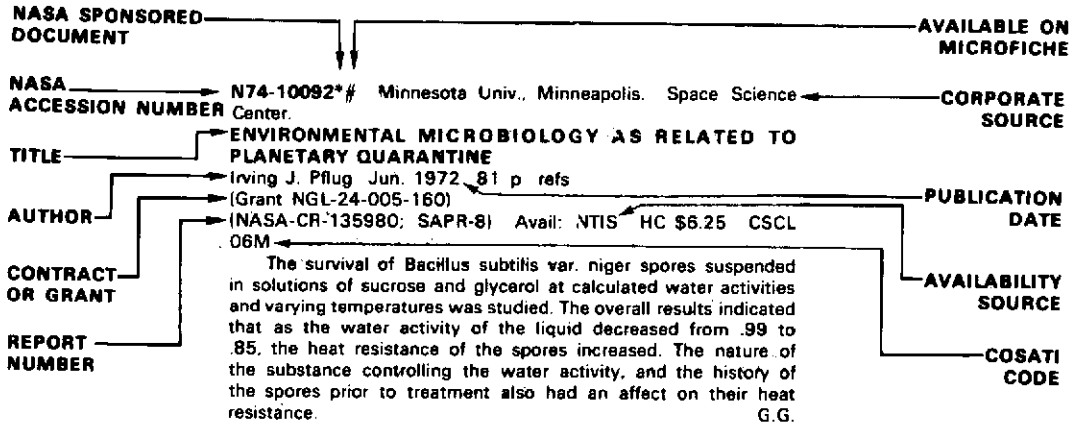
University Microfilms, Ltd.
Tylers Green
London, England

U.S. Atomic Energy Commission
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

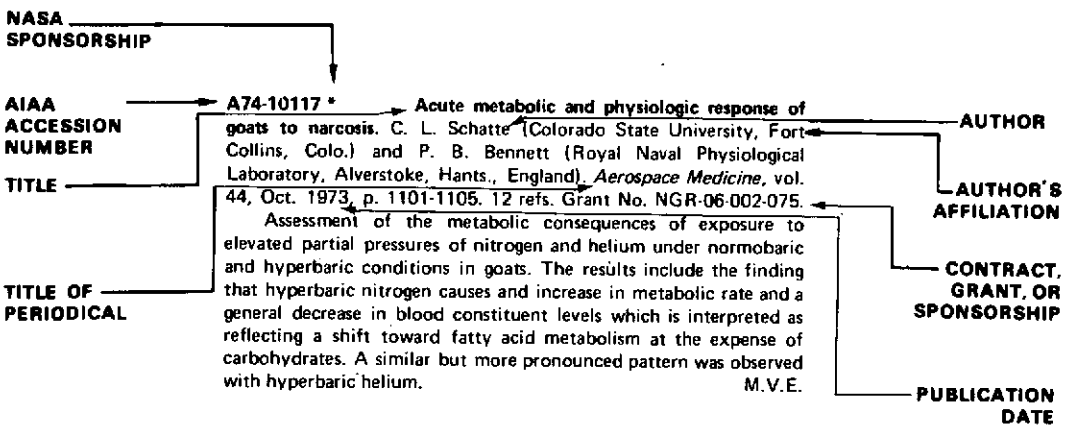
Zentralstelle für Luftfahrtdokumentation und -Information
8 Munchen 86
Postfach 880
Federal Republic of Germany

TABLE OF CONTENTS

TYPICAL CITATION AND ABSTRACT FROM STAR



TYPICAL CITATION AND ABSTRACT FROM IAA



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 130) JULY 1974

IAA ENTRIES

A74-25718 **Tables for making an early decision in precedence tests.** R. E. Little (Michigan, University, Dearborn, Mich.). *Journal of Testing and Evaluation*, vol. 2, Mar. 1974, p. 84-86. 5 refs.

Tables are given for critical values of Young's nonparametric D statistic which, depending on the actual test outcome, may permit early termination of precedence test programs. If at some time during the testing of a new design Y along with the present design X, the instantaneous difference between the number of X failures and Y failures reaches a critical value listed in the tables, the precedence testing is immediately terminated with the decision that design Y is better than design X. Techniques for obtaining a test as unbiased as possible are discussed.
P.T.H.

A74-25726 **Problems associated with the automatic quantitative analysis of cerebral electrical activity (Problèmes posés par l'analyse automatique et quantitative de l'activité électrique cérébrale).** L. Court, P. Laget, R. Dufour, M.-H. Bassant, G. Rouif, P. Hillion, and H. Warme-Janville (Ministère des Armées, Service de Santé des Armées, Clamart; Commissariat à l'Energie Atomique, Fontenay-aux-Roses, Hauts-de-Seine; Paris, Université, Faculté des Sciences; Délégation Ministérielle pour l'Armement, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 517-524; Discussion, p. 524, 525. In French. Direction des Recherches et Moyens d'Essais Contract No. 72/618.

Theoretical and practical problems arising in the quantification and automatic classification of EEG records are reviewed with respect to data acquisition, selection of analysis methods, and result classification and utilization. Special attention is given to harmonic analysis techniques.
M.V.E.

A74-25727 **Trial utilization of a vision tester in flight crew examinations (A propos d'un essai d'utilisation du vision tester dans l'expertise du personnel navigant).** J. Chevaleraud (Ministère des Armées, Service de Santé des Armées, Paris, France) and G. Santucci (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 526-530. In French.

Description of a vision tester of compact design and easy use intended for general, work-safety ensuring personnel checks by nonspecialized physicians, and appraisal of its merits in ophthalmologic examinations of flight crews. In the light of results obtained in tests administered to 25 male and female flight crew subjects, the potentialities and limitations of the vision tester are discussed.
M.V.E.

A74-25728 **Telemetering technique for the polygraphic recording of sleep in unconstrained adult chimpanzees - Methodology (Technique de télémesure pour enregistrements polygraphiques du sommeil chez le chimpanzé adulte non contraint - Méthodologie).** M. J. Klein, C. L. Milhaud (Centre de Recherches de Médecine Aéronautique, Paris, France), and H. Axelrad. *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 531-536. 18 refs. In French. Direction des Recherches et Moyens d'Essais Contracts No. 632/68; No. 72/298.

A74-25729 **Comparative study of the psychotoxicity of amphetamines in animal and man (Etude comparée de la psychotoxicité des amphétaminiques chez l'animal et chez l'homme).** C. L. Milhaud (Ministère des Armées, Service de Santé pour l'Armée de l'Air, Paris, France) and M. J. Klein (Centre de Recherches de Médecine Aéronautique, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 537-541. 24 refs. In French.

The psychotoxic effects of amphetamines in animals ranging from rodents to primates and in man are shown to exhibit far-reaching analogies, but also significant differences, particularly in man. The implications of these analogies and differences are discussed.
M.V.E.

A74-25730 **Heat exchange in man in a hyperbaric helium-oxygen atmosphere. I - Present state of the problem. II - Experimental study of the metabolism up to 31 atm /abs/. III - Experimental study of caloric losses by respiratory convection up to 31 atm /abs/. IV - Experimental study of the coefficient of heat exchange by convection up to 31 atm /abs/ (Echanges thermiques de l'homme en milieu hélium-oxygène hyperbare. I - Etat actuel de la question. II - Etude expérimentale du métabolisme jusqu'à 31 Ata. III - Etude expérimentale de la déperdition calorique par convection respiratoire jusqu'à 31 Ata. IV - Etude expérimentale du coefficient d'échange thermique par convection jusqu'à 31 Ata).** J. Timbal, H. Vieillefond, H. Guenard, and P. Varene (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 542-565. 100 refs. In French.

The problems encountered in the evaluation of the metabolism of man in a hyperbaric helium-oxygen atmosphere are reviewed in the light of published and ongoing pertinent research. Metabolism measurement results performed upon four divers during a simulated dive up to 31 atm (abs) in a helium-oxygen atmosphere are reported. This experiment confirms that heat losses due to respiratory convection are a function of both ambient pressure and inspired gas temperature, and lends encouragement to studies of inhaled-gas reheat devices for professional divers. Thermal losses due to cutaneous convection are inferred from all the other measurements of heat-balance elements. The merits of various manners of representing the coefficient of heat exchange by convection are discussed.
M.V.E.

A74-25731 **Discovery of scotopic vision disorders in a student pilot (A propos de la découverte de troubles du sens lumineux chez un élève pilote).** P. J. Manent (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France) and J. P. Chevaleraud (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 566, 567. In French.

Discussion of an apparently isolated case of deficient scotopic vision discovered in an ophthalmologically screened, 23-year old student pilot after 180 flight hours. Complaining about a 'subjective syndrome' that made him dread and give up his but little earlier dearly loved hobby of driving at night, this student pilot showed no observable general or occular anatomo-clinical condition in support of that syndrome. The implications of this case for ophtalmological screening and checking requirements are examined. M.V.E.

A74-25732 **Contact lens tolerance among commercial flight personnel (A propos de la tolérance des prothèses de contact chez le personnel navigant commercial).** J. P. Boissin (Compagnie Nationale Air France, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 568, 569. 6 refs. In French.

Review of the results of an investigation of contact lens tolerance among commercial flight crews. These results indicate that contact lenses are well tolerated for time stretches that do not exceed 3 to 4 nonstop flight hours. Tolerance problems start and multiply at longer nonstop flight durations. M.V.E.

A74-25733 **Total radiography in medical examinations of flight personnel (La panradiographie dans l'expertise médicale du personnel navigant).** G. Gueffier (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France) and R. P. Delahaye (Hôpital Bégin, Saint-Mandé, Val-de-Marne, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 570-572. In French.

A74-25734 **Merits of the amyl nitrite test in the detection of obstructive cardiomyopathy in flight crews (Interêt de l'epreuve au nitrite d'amyle dans le depistage de la cardiomyopathiie obstructive chez le personnel navigant).** B. Raviart, G. Drobinski, A. Didier, R. Carre, and F. Plas (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 573-576. 20 refs. In French.

A74-25735 **Contribution to 1,1-dimethyl hydrazine toxicity studies (Contribution à l'étude de la toxicité de la 1,1 dimethylhydrazine).** P. Galban, G. Chatelier, A. Pfister, R. Falet, G. Santucci (Ministère des Armées, Service de Santé des Armées, Paris, France), and J. P. Chevrier. *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 577-581. 44 refs. In French.

Survey of published, mostly American, studies on the toxicity of unsymmetrical dimethyl hydrazine (UDMH), and review of the results of some complementary experimental studies performed by the authors. These latter studies confirm the earlier finding that, even though not very toxic, UDMH possesses a nonnegligible toxicity because of its effects upon the nervous system in cases of chronic poisoning. M.V.E.

A74-25736 **Cosmic radiation dosimetry on board the Concorde supersonic transport (Dosimétrie des rayonnements cosmiques à bord du transport supersonique Concorde).** H. François, G. Portal (Commissariat à l'Energie Atomique, Service Technique d'Etudes de Protection et de Pollution Atmosphérique, Fontenay-aux-Roses, Hauts-de-Seine, France), R. P. Delahaye (Hôpital Bégin, Saint-Mandé, Val-de-Marne, France), P. Simon (Meudon, Observatoire, Meudon, Hauts-de-Seine, France), H. Kaiser (Commissariat à l'Energie Atomique, Laboratoire de Physique Corpusculaire, Strasbourg, France), and P. Durney (Service Mixte de Sécurité Radiologique, Montléry, France). *(Congrès de Radioprotection, 4th, Washington, D.C., Sept. 15, 1973.)* *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 589-594. 7 refs. In French. Research sponsored by the Ministère des Transports Publics.

Review of the radiation monitoring techniques used on board the Concorde prototype supersonic transport during test flights at cruising altitudes above 12 km, and discussion of some of the results obtained. The monitoring means employed included: (1) nuclear emulsions for individual event analysis; (2) stacks of individual emulsions of varying sensitivity for determining the distribution of ionizing particles; (3) radiothermoluminescent radiation dosimeters; (4) fast neutron radiation dosimeters; and (5) radiation rate recording systems. The radiation doses registered at cruising altitude were slight. Special attention was given to the solar flare problem, but the radiation danger warning devices got never activated. M.V.E.

A74-25737 **Hematologic acclimatization to altitude (L'acclimatation hématologique à l'altitude).** G. Ringenbach. *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 595-600. 19 refs. In French.

Research in the field of altitude adaptation published over the last 20 years is reviewed, along with some of the investigations of hematologic acclimatization to altitude performed by the author. Special attention is given to the pathogenesis and prophylaxis of altitude adaptation disorders. M.V.E.

A74-25738 **Cardiovascular diseases in Mexican Air Lines pilots.** R. Iglesias Leal, C. Acoltzin (IMSS, Centro Médico Nacional, Mexico City, Mexico), and A. Leal Garza (IMSS, Centro Médico La Raza, Mexico City, Mexico). *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 4th Quarter, 1973, p. 608-611. 14 refs.

Cardiovascular disease occurrence in aviation pilots of the Mexican Air Lines is reviewed and compared with that in pilots of other national airlines. In particular, three cases of myocardial infarction are described that occurred in pilots during flight. Some additional measures for preventing and detecting cardiovascular problems in flight personnel are suggested. M.V.E.

A74-25772 * **Development of a Korotkov sound processor for automatic identification of auscultatory events. I - Specification of preprocessing bandpass filters.** D. P. Golden, Jr. (Cook County, Health and Hospitals Governing Commission, Chicago, Ill.), R. A. Wolthuis (USAF, School of Aerospace Medicine, Brooks AFB, Tex.), G. W. Hoffler (NASA, Johnson Space Center, Houston, Tex.), and R. J. Gowen (U.S. Air Force Academy, Colorado Springs, Colo.). *IEEE Transactions on Biomedical Engineering*, vol. BME-21, Mar. 1974, p. 114-118. 9 refs. Contract No. NAS9-7675.

Frequency bands that best discriminate the Korotkov sounds at systole and at diastole from the sounds immediately preceding these events are defined. Korotkov sound data were recorded from five normotensive subjects during orthostatic stress (lower body negative pressure) and bicycle ergometry. A spectral analysis of the seven Korotkov sounds centered about the systolic and diastolic auscultatory events revealed that a maximum increase in amplitude at the systolic transition occurred in the 18-26-Hz band, while a maximum decrease in amplitude at the diastolic transition occurred in the 40-60-Hz band. These findings were remarkably consistent across subjects and test conditions. These passbands are included in the design specifications for an automatic blood pressure measuring system used in conjuction with medical experiments during NASA's Skylab program. (Author)

A74-25773 * **Development of a Korotkov sound processor for automatic identification of auscultatory events. II - Decision logic specifications and operational verification.** R. A. Wolthuis (USAF, School of Aerospace Medicine, Brooks AFB, Tex.), D. P. Golden, Jr. (Cook County, Health and Hospitals Governing Commission, Chicago, Ill.), and G. W. Hoffler (NASA, Johnson Space Center,

Houston, Tex.). *IEEE Transactions on Biomedical Engineering*, vol. BME-21, Mar. 1974, p. 119-124. 10 refs. Contract No. NAS9-7675.

A74-25774 # **A nondestructive ultrasonic technique to measure diameter and blood flow in arteries.** R. M. Olson and J. P. Cooke (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *IEEE Transactions on Biomedical Engineering*, vol. BME-21, Mar. 1974, p. 168-171.

Consideration of the use of a recently developed transesophageal pulse-echo technique in combination with a noninvasive Doppler-shift technique to measure aortic diameter and blood flow. It is shown that this pulse-echo system makes it possible to aim an ultrasonic beam directly through the axis of the aorta at a known angle when the generating crystal is passed down the esophagus. By operating the pulse-echo and Doppler-shift systems simultaneously, it is possible to record Doppler velocity signals while using the pulse-echo system to continuously aim the ultrasonic beam and at the same time record the diameter. The pulse-echo system also indicates the distance between the crystal and the aortic walls.

A.B.K.

A74-25816 **The filling-in phenomenon in vision and McIlwain's periphery effect.** J. Moors, A. M. L. Coenen, H. J. M. Gerrits, and A. J. H. Vendrik (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands). *Experimental Brain Research*, vol. 19, Feb. 28, 1974, p. 343-350. 24 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

A74-25817 **Discrimination of isolation peep variants by squirrel monkeys.** D. Symmes and J. D. Newman (National Institutes of Health, National Institute of Child Health and Human Development, Bethesda, Md.). *Experimental Brain Research*, vol. 19, Feb. 28, 1974, p. 365-376. 14 refs.

Responses to variant forms of the isolation peep have been studied by behavioral techniques in a group of eight squirrel monkeys. Discrimination learning with variant pairs using shock avoidance methods was surprisingly fast, and equivalence testing without differential reward revealed that variant forms are spontaneously discriminated by captive squirrel monkeys. Evidence was obtained that features occurring in the first third of the isolation peep are more effectively utilized in choice behavior than features occurring in the last third. It is postulated that such features are part of a communicative system in this species. (Author)

A74-25818 # **Utilization of the relationship T/R in D sub 1 as a mass screening technique (Utilisation du rapport T/R en D sub 1 comme technique de 'mass screening').** P. Block (Bruxelles, Université Libre; Centre de Dépistage de l'Athérosclérose chez les Postiers Belges, Brussels, Belgium), F. Kornreich (Bruxelles, Université Libre; Hôpital Saint-Pierre, Brussels, Belgium), J. Doumit (Hôpital Saint-Pierre, Brussels, Belgium), and R. Bourgain (Bruxelles, Université Libre, Brussels, Belgium). *Acta Cardiologica*, vol. 29, no. 1, 1974, p. 1-10. 18 refs. In French.

The value of the T1/R1 ECG criterion was tested for 'mass screening' in order to differentiate subjects with a normal ECG from those with a pathological ECG. Instead of the Bloomfield value for T1/R1 less than 0.14, 0.30 was fixed as the lower limit for the 20 to 39 years age group, and 0.20 was fixed for the 40 to 59 years group. The authors obtained 8.5 per cent false positives for the 20 to 39 group, and 11.6 per cent for the 40 to 59 group. For lack of sensitivity, as demonstrated by the great number of false negatives (33 per cent for the total of the 199 pathological ECG's, and especially in cases of coronary insufficiency, right ventricular hypertrophy, and right bundle branch block), the method is not considered very appropriate for mass screening. F.R.L.

A74-25872 # **Saccadic suppression of a stimulus presented on a background of horizontal or vertical grating.** N. A. Iakimov (B'lgarska Akademiia na Naukite, Institut po Fiziologiia, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 26, no. 12, 1973, p. 1693-1695. 6 refs.

In order to cast additional light on the role of the structure in saccadic suppression, experiments were carried out in which the background was structured by vertical or horizontal gratings of one and the same spatial frequency. The results of the experiments carried out indicate that the structuring of the background with a vertical grating leads to considerable rise of the thresholds during a voluntary saccade. Upon using a horizontal grating with the same spatial frequency the visual thresholds remain almost unchanged, compared with the thresholds upon uniform background. Since the direction of the horizontal grating coincides with the direction of movement of the eyes, at the performance of a saccade there occur no changes connected with the shifting of the image on the retina.

F.R.L.

A74-25873 # **Probability prediction in the human brain function and the sensory evoked potentials.** A. D. Angelov and V. H. Stomoniakov (B'lgarska Akademiia na Naukite, Institut po Fiziologiia, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 26, no. 12, 1973, p. 1697-1700. 11 refs.

It was established in earlier studies on the dependence between reaction time and the EEG, which involved varying the duration and the probability of the foreperiods, that the change in the statistical structure of the signal series is accompanied by certain changes of the EEG in the interstimulus interval. It may be assumed that these EEG changes reflect the processes of the probability prediction of the brain function. The dependence between the probability prediction and the evoked EEG responses could be observed more distinctly in the changes of the different parameters of the average evoked potentials (AEP) when varying the probability characteristics of the signal series and when no foresignal is given. The stimuli used were two types of sound signals (800 and 1200 c/sec), equal in intensity and duration (30 msec). They followed at randomly varied intervals of 3.5, 4.5, and 5.5 sec. F.R.L.

A74-25925 # **Human perception of transient vibrations.** J. F. Wiss (Wiss, Janney, Elstner and Associates, Inc., Northbrook, Ill.) and R. A. Parmelee (Northwestern University, Evanston, Ill.). *American Society of Civil Engineers, Structural Division, Journal*, vol. 100, Apr. 1974, p. 773-787. Research sponsored by the American Iron and Steel Institute.

Ten subjects of different backgrounds, 20 to 37 years old, were subjected in standing and reclining positions to vertical and horizontal vibrations at 5 to 70 cps, with single amplitude displacements from 0.001 to 0.040 in. The subjects were then to classify the vibrations as slightly, distinctly or strongly perceptible, or as disturbing and very disturbing. A mathematical model was derived from the results for predicting human responses to transient vibrations. V.Z.

A74-25968 **Transfer of training and the measurement of training effectiveness.** A. S. Blaiwes, J. A. Puig, and J. J. Regan (U.S. Navy, Human Factors Laboratory, Orlando, Fla.). *Human Factors*, vol. 15, Dec. 1973, p. 523-533. 21 refs.

Transfer of training research has been conducted on actual training systems to determine: (1) the effectiveness of present training; (2) whether the training can be improved; and, (3) how the training might be improved. The present paper includes some major methodological and analytical considerations in performing this research - the experimental and descriptive models to use in investigating and expressing transfer, cost effectiveness evaluations, and aspects of the training system to be included in the study. A number of conclusions are derived from the transfer research and some popular research themes are identified. Desirable features for an applied research program for military training purposes are

presented. Problems arising from the use of the transfer of training model are traced to operational constraints placed on experimental manipulation and control, and to the inadequacy of performance measurement systems. (Author)

A74-26020 # **Time course for refilling of glycogen stores in human muscle fibres following exercise-induced glycogen depletion.** K. Piehl (Gymnastik- och Idrottshogskolan, Stockholm, Sweden). *Acta Physiologica Scandinavica*, vol. 90, Feb. 1974, p. 297-302. 23 refs. Research supported by the Semper Nutrition Foundation. SMRC Project 40X-2203.

A74-26021 # **Afferent discharge from human muscle spindles in non-contracting muscles - Steady state impulse frequency as a function of joint angle.** A. B. Vallbo (Umea, Kungl. Universitetet, Umea, Sweden). *Acta Physiologica Scandinavica*, vol. 90, Feb. 1974, p. 303-318. 52 refs. SMRC Project 14X-2075; SMRC Project 04X-3548.

A74-26022 # **Human muscle spindle discharge during isometric voluntary contractions - Amplitude relations between spindle frequency and torque.** A. B. Vallbo (Umea, Kungl. Universitetet, Umea, Sweden). *Acta Physiologica Scandinavica*, vol. 90, Feb. 1974, p. 319-336. 58 refs. SMRC Project 14X-2075; SMRC Project 04X-3548.

A74-26023 # **A colloid osmometer for small fluid samples.** K. Aukland and H. M. Johnsen (Bergen, Universitetet, Bergen, Norway). *Acta Physiologica Scandinavica*, vol. 90, Feb. 1974, p. 485-490. 8 refs.

Description of a colloid osmometer suitable for the performance of measurements upon samples as small as 5 microliters. Pellucid acryl plastic, used for most parts of the instrument, makes it possible to observe the reference fluid chamber at all times. Reproducible measurements were obtained on samples down to 4 microliters. M.V.E.

A74-26024 # **Acceleration stress and effects of propranolol on cardiovascular responses.** H. Bjurstedt, G. Rosenhamer, and G. Tyden (Karolinska Institutet, Stockholm, Sweden). *Acta Physiologica Scandinavica*, vol. 90, Feb. 1974, p. 491-500. 22 refs. Research supported by the Gosta Fraenckel's Fund. SMRC Project B72-40X-680-07A.

A study with human subjects was conducted concerning the cardiovascular responses to a three-fold increase of the force of gravity, taking into account also the effects of an administration of propanolol. In the case of an exposure to 3 G in the resting condition, the majority of the subjects reported a transient impairment of vision during the initial 15 sec of the experiment. After an administration of propanolol the exposure to 3 G was subjectively experienced as less unpleasant. Cardiac adjustments to exercise at 3 G were also investigated. G.R.

A74-26043 # **Protein and RNA contents in neurons and their glial satellite cells of the supraoptical nucleus in the rat brain after deprivation of the paradoxical phase of sleep for 24 hr (Soderzhanie belkov i RNK v neironakh i ikh glial'nykh kletkakh-satellitakh supraopticheskogo iadra golovnogo mozga krysy posle lisheniia ee paradoksal'noi fazy sna v techenie 24 chas).** N. N. Demin and N. L. Rubinskaia (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 214, Feb. 1, 1974, p. 940-942. 10 refs. In Russian.

A74-26044 # **Analysis of ventricular arrhythmias arising during modeling of auricular flutter or fibrillation (Analiz zheludochkovykh aritmii, vozmikaiushchikh pri modelirovanii trepetaniia ili mertsaniia predserdii).** E. B. Babskii, L. V. Mezentseva, and L. S. Ul'ianinskii (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 214, Feb. 1, 1974, p. 966-969. 5 refs. In Russian.

A74-26045 # **The influence of an evoked motor response on the RNA content in the neurons and neuroglia cells of the brain and spinal cord (Vliianie vynuzhdennoi dvigatel'noi aktivnosti na soderzhanie RNK v neironakh i kletkakh neiroglii golovnogo i spinnogo mozga).** B. Tiplady (Open University, Bletchley, Bucks., England), T. S. Glushchenko, and L. Z. Pevzner (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 214, Feb. 1, 1974, p. 973-976. 12 refs. In Russian.

A74-26049 Structural stimulus complexity - One factor influencing the clarity of iconic storage. K. D. Heyer (St. Francis Xavier University, Antagonish, Nova Scotia, Canada). *Acta Psychologica*, vol. 38, Feb. 1974, p. 21-31. 23 refs. Research supported by the St. Francis Xavier University; National Research Council of Canada Grant No. A-8337.

Using the procedure of partial report, or the probe technique, five Ss were required to process the position of items from a matrix containing fewer items than matrix cells. Different sets of stimulus cards containing items of varying structural complexity such as circles, 4-sided and 8-sided shapes were used to test the hypothesis that structural stimulus complexity and clarity of iconic storage are inversely related. Results were in accordance with the hypothesis and implications for the processing of visual information were discussed. (Author)

A74-26050 An empirical test of two psychophysical models. V. Graf, J. C. Baird, and G. Glesman (Dartmouth College, Hanover, N.H.). *Acta Psychologica*, vol. 38, Feb. 1974, p. 59-72. 18 refs. Grant No. PHS-4-R01-MH-1437-02.

Two theoretical relationships between sensitivity measures (Weber fractions, Ekman fractions, and their logarithms) and the exponents of the psychophysical power function were tested empirically with the brightness attribute. One model was based on Weber and Ekman fractions, the other on the logarithms of these measures. The stimulus parameters were time interval between standard and comparison targets and position of the standard in the luminance series. Weber fractions were based on data obtained by the method of constant stimuli, whereas Ekman fractions and exponents were based on data obtained by magnitude estimation. The results were in closer agreement with the theoretical predictions generated by the logarithmic model when group data were analyzed. With individual subjects, a detailed correspondence between fact and theory was not found with either model. (Author)

A74-26176 A theory for the neural basis of language. I - A neural network model. R. J. Baron (Iowa, University, Iowa City, Iowa). *International Journal of Man-Machine Studies*, vol. 6, Jan. 1974, p. 13-48. 57 refs.

A theory and corresponding model for the neural basis of language are proposed. A functional description of elementary visual-linguistic processes includes the selection and neural encoding of patterns from the visual field; the representation of visual experience in memory; the mechanisms of association between different types of visual and verbal information (such as naming of visual images, naming of positional relationships between processes, etc.); the neural representation of phrases and simple sentences; the recognition of simple sentences; and verbally directed recall of visual experience. A complete set of operational definitions is given. The neural networks are described, and several alternate control strategies for the networks are examined. V.P.

A74-26190 Thalamic and cortical integration of vestibular afferences (Intégration thalamique et corticale des afférences vestibulaires). M. Jeannerod, M. Magnin, and P. T. S. Putkonen (Institut National de la Santé et de la Recherche Médicale, Bron, Rhône,

France). *Journal de Physiologie*, vol. 66, Mar. 1974, p. 633-651. 87 refs. In French. Research supported by the Institut National de la Santé et de la Recherche Médicale.

The results of experiments and studies conducted in the past twenty-five years on the vestibular projections leading to the thalamus are reviewed. In particular, the vestibular influences on the visual system are discussed. Experiments are described which studied the response of the visual system to utricular stimulation, rotation of the head, and nystagmic and oculomotor influences. P.T.H.

A74-26200 * Tracking with head position using an electro-optical monitor. B. A. Chouet and L. R. Young (MIT, Cambridge, Mass.). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-4, Mar. 1974, p. 192-204. 10 refs. Grant No. NGR-22-009-156.

An electrooptical head-position monitoring system was designed and built and is used in single-axis and three-axis 'hands-off' control tasks. The monitor consists of a transparent plexiglass body-fixed helmet provided with a set of eight silicon photodetectors sensing pitch, roll, and yaw motions of the head. Two light-emitting diodes, attached to the pilot's helmet liner, provide the ac modulated near infrared radiation. Head control is compared with conventional manual control for single-axis and three-axis tracking tasks. Both performance curves and describing functions are presented. (Author)

A74-26213 Mathematical analysis of the response of lung ventilation to CO2 in normoxia and hyperoxia. H. T. Folgering, J. A. Bernards, J. H. Biesta, and F. Smolders (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands). *Pflügers Archiv*, vol. 347, no. 4, 1974, p. 341-350. 23 refs.

Past studies of ventilatory CO2 response at low CO2 pressures have found both linear and curvilinear response curves. Curves were drawn from the response to CO2 of 12 healthy male subjects, in normoxia and hyperoxia. It was attempted to fit these curves to an exponential equation with three unknown constants. Computer analysis obtained the values for the constants which gave the least deviation of the theoretical curve from the experimental one. Curves in hyperoxia made to eliminate the influence of O2 sensitive chemoreceptors showed a marked shift to the right. The exponential shape of the CO2 response curves is interpreted as indicating that the receptor units of the CO2 sensitive chemoreceptors do not all have the same threshold. P.T.H.

A74-26214 Automatic stabilization of inspiratory oxygen pressure and endexpiratory carbon dioxide pressure in a closed spirometer system. H. T. Folgering, J. A. Bernards, J. F. Sistermans, and B. Michels (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands). *Pflügers Archiv*, vol. 347, no. 4, 1974, p. 351-357. 9 refs.

A74-26215 Prediction of hemodynamic data in atrial septal defects of secundum type from simple and combined vectorcardiographic data. K. Rasmussen. *American Heart Journal*, vol. 87, Apr. 1974, p. 413-420. 19 refs.

A study involving 50 patients with atrial septal defects was conducted in order to determine if simple vectorcardiographic data are significantly correlated with hemodynamic measurements in atrial septal defects. Another objective of the study was to investigate the effect of flow and pressure on the electrocardiographic picture of right ventricular hypertrophy. The effectiveness of a certain statistical approach in improving the prediction characteristics of hemodynamic data was also explored. G.R.

A74-26216 The prediction of maximal oxygen consumption from a continuous exercise treadmill protocol. V. F. Froelicher, Jr. and M. C. Lancaster (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *American Heart Journal*, vol. 87, Apr. 1974, p. 445-450. 11 refs.

A74-26245 # Non-aqueous biosystems - The case for liquid ammonia as a solvent. P. Molton (Maryland, University, College Park, Md.). *British Interplanetary Society, Journal*, vol. 27, Apr. 1974, p. 243-262. 32 refs.

The possibility that some form of life based on liquid ammonia instead of water may exist in the solar system and elsewhere is considered. The mechanism of prebiological evolution of such a system is presented, and arguments against the hypothesis of nonaqueous life are discussed. From all points of view, there is no real evidence that nonaqueous life is an impossibility, and much indirect evidence in favour of its existence. The solvent properties of ammonia, the hydrogen guanide/guanidine buffer system, solubilities of inorganic salts in liquid ammonia, the bond strengths of nitrogen analogues of terrestrial biopolymers, and stereochemistries and nucleophilicities of relevant compounds are all suggestive of the possibility of non-aqueous life. (Author)

A74-26323 # The 'wakefulness complex' in the evoked response of the visual cortex, its early maturation, and properties ('Kompleks bodrstvovaniia' v vyzvannom otvete zritel'noi kory, ego rannee sozrevanie i svoistva). F. Ata-Muradova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and I. Mamikoniants (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 214, Jan. 21, 1974, p. 723-726. 12 refs. In Russian.

Analysis of the ontogenesis of the visual response of the cortex in the awake rabbit. A detailed study is made of the formation of a positive-negative oscillation called the 'wakefulness complex'. It is found that the early and accelerated maturation of the 'wakefulness complex' in ontogenesis, its high degree of excitability, and, of course, the brain stem genesis attest to the possibility of primary integration of visual stimuli at the brain stem level in highly stimulatable visual structures which retain a state of heightened excitability for long periods of time. Thus the first information which the brain cortex obtains concerning a visual stimulus in the process of development is information concerning its biological parameters, and only much later do the cortical channels of discrete stimulus evaluation mature. A.B.K.

A74-26400 Skylab provides habitability guidelines. C. Covault. *Aviation Week and Space Technology*, vol. 100, Apr. 8, 1974, p. 58-61.

Review of the space station habitability and locomotion studies carried out during the 171-day occupancy of the Skylab workshop by nine astronauts. The main conclusion they lead to is that manned space stations of the future will require few design changes for man to work comfortably in zero-g surroundings. Discussed habitability and comfort features include: vehicle architecture, environment, hygiene considerations, housekeeping needs, clothing, communications, and maintenance potential. M.V.E.

A74-26444 Experiments and results relating to the pathological action of impulsive noise (L'action pathologique des bruits impulsionnels, expérimentations et résultats). R. Unterreiner, M. Richard (Institut National des Sciences Appliquées, Lyons, France), and J. C. Lafon (Besancon, Université, Besançon, France). *Acustica*, vol. 30, Feb. 1974, p. 100-108. 12 refs. In French.

The measurement of impulsive sound is made generally either by means of a sound-level meter or by oscilloscope observations. In order to avoid the disadvantages peculiar to these methods, we have developed an apparatus especially designed for impulsive sounds of very short intensity. We have been able to show the periods of maximum energy of these sounds and, on the basis of the physiological data, the physical criteria of their harmfulness. The decisive action of low frequencies established in this study underlines the difficulties encountered during research into the reduction of their nuisance. (Author)

A74-26473 **Coronary angiography.** H. A. Baltaxe (Cornell Medical College; New York Hospital, New York, N.Y.), K. Amplatz (Minnesota, University, Hospital, Minneapolis, Minn.), and D. C. Levin (Cornell Medical College, New York, N.Y.). Research supported by the Squibb Laboratories. Springfield, Ill., Charles C. Thomas, Publisher, 1973. 246 p. 134 refs. $22.50.

A detailed account is given of the techniques available to the clinician for performing selective coronary angiography and for the interpretation of coronary angiograms. Among the techniques used for selective coronary angiography are the Sones technique and various percutaneous techniques, including that of Ricketts and Abrams, the Amplatz technique, the roentgenographic technique, the Judkins technique, and the New York Hospital technique. Other topics discussed are the anatomy of the normal coronary artery tree, congenital anomalies of the coronary vessels, complications and contraindications involved in coronary angiography, electrocardiographic and hemodynamic changes seen during selective coronary arteriography, and the effect of coronary atherosclerosis and collateral circulation on the left ventriculogram. Finally, postsurgical coronary arteriograms following myocardial revascularization operations are discussed. A.B.K.

A74-26551 # **Role of the hippocampus in processes of the fixation and retention of stimulus traces in the cerebral cortex (Rol' gippokampa v protsessakh fiksatsii i uderzhaniia sledov razdrazhenii v kore bol'shikh polusharii).** E. G. Zarkeshev, V. L. Silakov, and B. T. Moroz (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 154-162. 13 refs. In Russian.

A74-26552 # **Role of sympathetic nerves of the solar plexus in regulation of the hepato-biliary system functions (O roli simpaticheskikh nervov solnechnogo spleteniia v reguliatsii funktsii gepato-biliarnoi sistemy).** B. E. Esipenko, A. P. Kostromina, and A. V. Syromiatnikov (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 179-186. 19 refs. In Russian.

A74-26553 # **Effect of a visual afferent activity deficit on the electroretinogram recovery cycle (Vliianie defitsita zritel'noi afferentatsii na tsikl vosstanovleniia elektroretinogrammy).** L. P. Grigor'eva and V. A. Markevich (Akademiia Pedagogicheskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 187-192. 19 refs. In Russian.

Electroretinograms were recorded during the delivery of single light pulses or pairs of light pulses to the eyes of rabbits kept in darkness from birth or from the age of six months. The amplitudes of b-waves in response to 1.0 and 0.1 microsec stimuli under scotopic conditions were smaller than normal in all rabbits. The restoration of normal retinograms in response to stimuli of longer duration is discussed. V.Z.

A74-26554 # **Fluid pressure level in the intermeningeal space of the rabbit optic nerve (Ob urovne davleniia zhidkosti v mezhobolochechnykh prostranstvakh zritel'nogo nerva krolika).** V. V. Volkov and R. I. Korovenkov (Voenno-Meditsinskaia Akademiia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 193-196. 6 refs. In Russian.

A74-26555 # **Modeling of the transcapillary oxygen exchange in the skeletal muscle (Modelirovanie transkapilliarnogo obmena kisloroda v skeletnoi myshtse).** E. G. Liabakh (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 212-217. 11 refs. In Russian.

A74-26556 # **Seasonal changes of the circadian rhythms of corticosteroids and electrolytes in human saliva - Computer analysis by the Kosinor program (Sezonnye izmeneniia tsirkadnykh ritmov kortikosteroidov i elektrolitov v sliune u cheloveka - Analiz na EVM po programme 'Kosinor').** A. F. Bazhenova, N. V. Baginskaia, M. G. Kolpakov, and P. V. Matveev (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki; Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 277-282. 24 refs. In Russian.

A74-26557 # **Experimental investigation of the role of thyrocalcitonine in the prophylaxis of disturbances in the water-salt and mineral metabolism during a 30-day hypokinesia (Eksperimental'noe issledovanie roli tirokal'tsitonina v profilaktike narushenii vodno-solevogo i mineral'nogo obmena pri 30-sutochnoi gipokinezii).** V. S. Shashkov, B. B. Egorov, B. S. Dmitriev, A. I. Volozhin, and V. P. Krotov. *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 290-294. 10 refs. In Russian.

A74-26558 # **A biopotential evoked by mechanical stimulation of the eye - The mechanoelectroretinogram (Biopotentsial, vyzvannyi mekhanicheskim razdrazheniem glaza - Mekhanoelektroretinogramma).** V. N. Prokof'ev (Nauchno-Issledovatel'skii Institut Glaznykh Boleznei, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 295-298. 12 refs. In Russian.

A technique of eye stimulation by applying pressure levels of 10, 30, 60, 90, and 120 to the eyeball for mechanophosphene evocation, with simultaneous recording of a mechanoelectroretinogram, is described. Silver electrodes were used for eyeball potential recording in ten subjects after a 15 min adaptation in a dark chamber in a study of eye biopotentials evoked by mechanical stimulation. Some typical mechanoelectroretinograms are included. V.Z.

A74-26559 # **Morphology and enzymatic activity of the blood under major physical strain (Morfologiia i fermentativnaia aktivnost' krovi pri bol'shoi fizicheskoi nagruzke).** Iu. T. Chernikov and E. Ia. Dumin (Pedagogicheskii Institut, Lugansk, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Feb. 1974, p. 302-304. 8 refs. In Russian.

A74-26601 **Stress and the heart.** Edited by R. S. Eliot (Nebraska, University, Hospital, Omaha, Neb.). Mount Kisco, N.Y., Futura Publishing Co., Inc. (Contemporary Problems in Cardiology. Volume 1), 1974. 415 p. $14.95.

The papers deal with the relation of environmental factors to systemic arterial hypertension and with community and occupational influences in stress. The physiology and the psychophysiology of stress; stress and hemostatic mechanisms; the role of behavior patterns and neurogenic factors in the pathogenesis of coronary heart disease; and neurocirculatory asthenia are considered. Attention is given to the pharmacological approaches to cardiac stress; biofeedback; decreased blood pressure associated with the regular elicitation of relaxation response; and the role of exercise in the relief of stress. The exercise electrocardiogram vs the coronary arteriogram is studied, and available stress testing techniques are assessed. F.R.L.

A74-26602 **The relation of environmental factors to systemic arterial hypertension.** H. Benson and M. C. Gutmann (Boston City Hospital; Harvard University, Boston, Mass.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 13-31. 86 refs. Research supported by the General Service Foundation; Grants No. PHS-HL-14486-02; No. PHS-HL-10539-06; No. PHS-RR-76.

Epidemiologic studies have shown consistent differences in systemic arterial blood pressure levels between American Negro and Caucasian groups, urban and rural populations, and socioeconomic groups varying in standard of living, income, occupation, and

education. The observed patterns were consistent with the hypothesis that elevated systemic arterial blood pressure in Western urban environments was related to the conflict and uncertainty inherent in a rapidly changing social system. The interaction of environment with psychological and personality factors is explored. The experimental induction of elevated systemic arterial blood pressure is discussed together with physiologic mechanisms meditating environmental and psychological effects on blood pressure. G.R.

A74-26603 **Community and occupational influences in stress at Cape Kennedy - Relationships to heart disease.** R. G. Reynolds (Florida, University, Gainesville, Fla.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 33-49. 12 refs.

General considerations are discussed for the design of experiments which study community stress and its relation to coronary heart disease. A total of 148 male employees at the Kennedy Space Center underwent psychological, physical, laboratory, and electrocardiographic examinations four weeks and one week before a moonshot and one week after the launch. Data from these tests are presented in tabular form. Analysis of the results found no difference between one group of employees who had an intimate and vital role in the launch and a group of people who had no responsibility for it. It was noted that blood sugar counts increased one week before the launch but then subsided afterwards, while eosinopenia increased one week before the launch but persisted. The test did not prove the hypothesis of a link between occupational stress at Kennedy Space Center and a high incidence of cardiovascular disease in that community, but it is emphasized that there seems to be a striking increase in the incidence of abnormal EKG's among workers there compared to other populations described in the medical literature. P.T.H.

A74-26604 **Occupation - A key factor in stress at the Manned Space Center.** G. J. Warheit (Florida, University, Gainesville, Fla.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 51-65. 24 refs. Research supported by the Florida Heart Association.

A description is given of some of the indicators of social-psychiatric stress associated with differing occupational groups at Cape Kennedy, Florida. Evidence of job stress was found. However, the establishment of a causal relationship between that stress and coronary heart disease as investigated in the study has not been demonstrated. The relationships between occupational stress and heart disease are found to be elusive, and a great deal of additional research is required before those relationships can be identified. G.R.

A74-26605 **Physiology of stress.** J. P. Gilmore (Nebraska, University, Omaha, Neb.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 69-90. 35 refs.

It is generally accepted that the defense reaction of the 'fight and flight' response is a basic physiological stress response which is activated by a wide range of cardiovascular changes for which the integrating area appears to be, at least in part, the hypothalamus. The cardiovascular responses elicited by stimulation of this portion of the brain stem mimick the responses observed during the defense response and also the cardiovascular responses observed in man during mental stress. In the present work, the general theme is developed that, although the defense reaction is of survival benefit in the wild, it may lead to cardiovascular disease in man. Data are first presented describing the cardiovascular effects of electrical stimulation of the defense area(s) in the hypothalamus of experimental animals. Then, data are presented from human subjects showing that the cardiovascular response to mental stress are the same as those elicited by direct hypothalamic stimulation. Finally, data are presented describing the effects of blood pressure and heart rate on myocardial performance. P.T.H.

A74-26606 **On the psychophysiology of stress - A commentary.** D. Shapiro (Harvard University, Boston, Mass.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 91-96. 13 refs. Grant No. NIH-MH-08853; Contract No. N00014-67-A-0298-0024.

Complex causal interrelations between the factors involved in the heart disease caused by psychological stresses of modern technology-oriented life are considered. Smoking, high blood pressure, aversive environmental events, deprivation of pleasure, and other frustrations are indicated as such factors. Cognitive factors, such as thoughts and imagery in determining physiological and emotional states, and the sense of helplessness are also noted as contributors to health problems of today. V.Z.

A74-26607 **Stress and hemostatic mechanisms.** R. B. Davis (Nebraska, University, Omaha, Neb.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 97-122. 148 refs. Research supported by the Nebraska Heart Association.

Alterations and the possible significance of changes in selected components of the hemostatic mechanism as related to stress and causing hemorrhage or vascular occlusion are evaluated. Attention is given to stress and vascular integrity, stress and blood platelets, stress and coagulation factors, stress and fibrinolysis, and myocardial necrosis, stress, and hemostatic mechanisms. It is shown that stress may play a role in the promotion of bleeding, platelet aggregation, and thrombosis, and that various factors promote one or another dominant effect. By identifying mechanisms with greater precision, it may be possible in the future to block the effect of specific changes arising in stress situations and thereby to reduce morbidity and mortality associated with vascular disease. F.R.L.

A74-26608 **The role of behavior patterns and neurogenic factors in the pathogenesis of coronary heart disease.** R. H. Rosenman (Mount Zion Hospital and Medical Center, San Francisco, Calif.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 123-141. 99 refs. Research supported by the Irwin Strasburger Memorial Medical Foundation of New York; Grants No. NIH-HL-03429; No. NIH-HL-00119.

The Type A Behavior Pattern is a particular action-emotion complex which is exhibited by an individual who is engaged in a relatively chronic and excessive struggle to obtain a usually unlimited number of things from his environment in the shortest period of time or against the opposing efforts of other things or persons in this same environment. Data are described that deal with the associational and apparently causal behavior of Type A Behavior Pattern and allied psychosocial factors with coronary heart disease (CHD). The epidemiological data indicate clearly that a very strong association does exist between this behavior pattern and the prevalence and incidence of CHD. The experimental data in animals indicate that neurogenic factors are clearly involved in the regulation of the plasma lipids. It would appear that neurogenic factors play an important role in the pathogenesis of CHD. F.R.L.

A74-26609 **Neurocirculatory asthenia.** G. J. Caranasos (Florida, University, Gainesville, Fla.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 219-244. 53 refs.

Neurocirculatory asthenia (NCA) is a common clinical syndrome with a frequently positive family history, an early onset, and an often chronic but usually benign course with remissions and exacerbations. Symptoms resemble most closely those of anxiety and are worsened by effort and emotional stress. The etiology is probably the result of complex psychological factors with anxiety acting as the principal central stimulus. Symptoms are in large part due to central stimulation expressed via the autonomic nervous system. A link is formed between somatic symptoms and effort. Symptoms are misinterpreted as arising from the heart which leads to further anxiety. A vicious cycle is established and perpetuated. NCA is an

example of emotional stress producing symptoms referable to the heart and is the most common form of functional heart disease seem by clinicians. F.R.L.

A74-26610 The pharmacological approaches to cardiac stress. E. B. Sigg (Hoffmann-LaRoche, Inc., Nutley, N.J.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 263-278. 37 refs.

The defense reaction, occurring in animals and man in response to many different stressors, is a useful model with which to investigate cardiovascular maladaptation. A pharmacotherapeutic approach to cardiac stress has to rely at present on drugs which blunt the excessive discharge of central autonomic hyperactivity into the cardiovascular end-organs. Barbiturates, benzodiazepines, and propanediols are the most effective candidates available to date. In addition, blockade of adrenergic stimuli on the heart by beta-blocking agents may be useful. F.R.L.

A74-26611 Biofeedback - A behavioral approach to cardiovascular self-control. D. Shapiro, G. E. Schwartz (Harvard University, Boston, Mass.), and H. Benson (Boston City Hospital; Harvard University, Boston, Mass.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 279-292. 35 refs. Research supported by the General Service Foundation; Grants No. NIH-MH-08853; No. PHS-5-R01-HL-14486; No. PHS-HE-10539; No. PHS-RR-76; Contracts No. N00014-67-A-0298-0024; No. N00014-70-C-0350.

Biofeedback consists of the translation of visceral and neural responses into a sensory analog which is provided to the individual as information about his own physiological responses. Some of the essential features of clinical relevance in the use of biofeedback for the control of cardiovascular responses are described. Major attention has been given in the laboratory to the application of biofeedback and reward procedures to the self-regulation of blood pressure in healthy human subjects and in patients with essential hypertension. F.R.L.

A74-26612 Decreased blood pressure associated with the regular elicitation of the relaxation response - A study of hypertensive subjects. H. Benson, B. R. Marzetta, and B. A. Rosner (Boston City Hospital; Harvard University, Boston, Mass.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 293-302. 29 refs. Research supported by the General Service Foundation; Grants No. PHS-HL-14486-02; No. PHS-RR-76; No. PHS-HL-10539-07; No. PHS-HD-03693; No. PHS-T01-AI-00068.

A74-26613 The role of exercise in the relief of stress. E. W. Fuller, Jr. and R. S. Eliot (Nebraska, University, Omaha, Neb.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 311-323. 26 refs.

An attempt is made to review the evidence and help clarify how an individual who has survived a myocardial infarction fits into an effective exercise program. Suggested beneficial effects of exercise therapy on cardiovascular function and rehabilitation are decreased myocardial oxygen requirements, increased collateral circulation, decreased incidence of infarction and sudden death, decreased risk factors, and increased cardiac reserve. The components of an exercise program are intensity, duration, and frequency. In determining how to apply each of these components to individual patients, the physician first has to gauge the patient's exercise tolerance. F.R.L.

A74-26614 Exercise electrocardiogram vs coronary arteriogram. W. Likoff (Hahnemann Medical College and Hospital, Philadelphia, Pa.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 327-333. 8 refs.

The technique of coronary arteriography calls for the deliberate installation of an opaque material into each coronary ostium and filming the opacified circulation with a motion picture camera. Coronary arteriography is indicated whenever the structural information it provides is essential to diagnosis or treatment. Among its many disclosures are the origin, distribution, external configuration, and internal caliber of the coronary blood vessels, as well as the anatomy of the collateral circulation. Electrocardiographic response to exercise stress testing is discussed. Diagnostic accuracy in asymptomatic patients is pertinent in the final evaluation of electrocardiographic exercise testing. F.R.L.

A74-26615 Assessment of available stress testing techniques /treadmill, bicycle ergometer, etc./. H. Starke and R. S. Eliot (Nebraska, University, Omaha, Neb.). In: Stress and the heart. Mount Kisco, N.Y., Futura Publishing Co., Inc., 1974, p. 335-367. 93 refs.

The fundamentals of exercise physiology, indications and contraindications for exercise stress testing, methods of exercise testing, standardication of workload, standardization of EKG criteria, and safety precautions in exercise stress testing are discussed. Work physiologists have studied physiological parameters associated with exercise, with emphasis on maximal human performance. Clinicians have been interested in evaluating the effects of physical stress in heart disease. A variety of methods for testing have been employed, and the degree of stress imposed varies widely also. F.R.L.

A74-26717 The origins of life: Molecules and natural selection. L. E. Orgel (Salk Institute for Biological Studies, San Diego, Calif.). Research supported by the John Simon Guggenheim Memorial Foundation. New York, John Wiley and Sons, Inc., 1973. 231 p. 20 refs. $7.50.

Following a review of the historical background, the fossil record, molecular biology, topics in biochemistry, and the biochemical record are discussed. The history of the earth, atmosphere, and oceans is outlined. Sources of energy, prebiotic synthesis, the formation of polymers, replicating molecules and natural selection, the transition from replicating polymers to cells, and natural selection are treated. A section is devoted to aspects of extraterrestrial life. F.R.L.

A74-26719 On time-dependent blood flow. T. Ariman (Notre Dame, University, Notre Dame, Ind.), M. A. Turk (Notre Dame, University, Notre Dame; American Oil Co., Whiting, Ind.), and N. D. Sylvester (Notre Dame, University, Notre Dame, Ind.; Tulsa, University, Tulsa, Okla.). *Letters in Applied and Engineering Sciences*, vol. 2, Mar. 1974, p. 21-36. 40 refs.

Time-dependent blood flow between two parallel plates due to an arbitrary pulsatile pressure gradient is analyzed using a micro-continuum model of blood. Exact solutions to the set of governing equations are obtained through the application of a consecutive transformation technique. The time-dependent pressure gradient is represented by a Fourier series for numerical computation, and the results are presented graphically. (Author)

A74-26798 Attempt to quantitate relation between cardiac function and infarct size in acute myocardial infarction. D. Mathey, W. Bleifeld, P. Hanrath, and S. Effert (Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *British Heart Journal*, vol. 36, Mar. 1974, p. 271-279. 29 refs. Research supported by the Deutsche Forschungsgemeinschaft.

The hemodynamic changes observed in 82 patients with acute myocardial infarction are compared with the estimates of the extents of infarct inferred from the determination of enzyme contents and creatine phosphokinase concentration in the serum. The results are interpreted as suggesting that a weakening of the cardiac function

during the acute phase of myocardial infarction is due to a recent myocardial necrosis. Infarct area stiffening and a normal or increased contractility of the noninfarcted portion of the myocardium are viewed as compensatory mechanisms. A combined investigation of hemodynamic and enzymatic changes is characterized as an effective technique for recognition of recent and old myocardial necrosis cases and for immediate and long-term infarct prognoses. V.Z.

A74-26872 Influence of artificial dead space on respiratory and blood gases in trained and untrained subjects during hypoxia and physical work (Einfluss eines apparativen Totraums bei trainierten und untrainierten Versuchspersonen auf die Atem- und Blutgase unter Hypoxie und körperlicher Belastung). H. Günther, H. Metzger, G. Thews, and H.-R. Vogel (Mainz, Universität, Mainz, West Germany). *European Journal of Applied Physiology*, vol. 32, no. 3, 1974, p. 217-226. 35 refs. In German.

A74-26990 * Serotonin and pituitary-adrenal function. P. A. Berger, J. D. Barchas (Stanford University, Stanford, Calif.), and J. Vernikos-Danellis (NASA, Ames Research Center, Human Studies Branch, Moffett Field, Calif.). *Nature*, vol. 248, Mar. 29, 1974, p. 424-426. 11 refs. PHS-NASA-supported research.

An investigation is conducted to evaluate the response of the pituitary-adrenal system to a stress stimulus in the rat. In the investigation brain serotonin synthesis was inhibited with p-chlorophenylalanine. In other tests the concentration of serotonin was enhanced with precursors such as tryptophan or 5-hydroxytryptophan. On the basis of the results obtained in the study it is speculated that in some disease states there is a defect in serotonergic-neuronal processes which impairs pituitary-adrenal feedback mechanisms. G.R.

A74-26991 Visual attention affects brain blood flow. S. C. Bondy, R. A. W. Lehman, and J. L. Purdy (Colorado, University, Denver, Colo.). *Nature*, vol. 248, Mar. 29, 1974, p. 440, 441. 13 refs. Research supported by the Foundations' Fund for Research in Psychiatry, University of Colorado, and NIH.

The investigation reported shows that cerebral blood flow may in part be regulated by the extent of mental activity. In the experiments blinkers were attached to chicks in such a way that one eye could see only forward and the other only backward. Data concerning relative blood flow rates in the two sides of a chick brain were obtained and a statistical comparison was made between data derived from birds pecking at grain relative to birds not receiving grain. The asymmetry of regional blood flow in the pecking chicks was significantly greater than corresponding values for nonpecking chicks. G.R.

A74-27148 Visual perception of static and dynamic two-dimensional objects. D. A. Bogard (State University College, Cortland, N.Y.). *Perceptual and Motor Skills*, vol. 38, Apr. 1974, p. 395-398. 8 refs.

Ayres's (1966) Southern California Figure-ground Visual Perception Test was used along with an adaptation of it to investigate the differences between visual perception of static (nonmoving) and dynamic (moving) two-dimensional objects in human subjects at four different age levels. All groups made few errors in perception of moving objects, which was interpreted as supporting the view that perception of movement may be the most primitive of all visual perceptions. With increased age and experience, the ability to perceive moving objects improved, but then worsened among elderly adults. P.T.H.

A74-27149 * Sympathetic and parasympathetic components of reflex tachycardia induced by hypotension in conscious dogs with and without heart failure. S. F. Vatner (Harvard University; Peter Bent Brigham Hospital, Boston, Mass.), C. B. Higgins (Children's Hospital, Boston, Mass.), and E. Braunwald (California, University, San Diego, Calif.). *Cardiovascular Research*, vol. 8, Mar. 1974, p. 153-161. 24 refs. NASA-supported research; Grant No. PHS-HL-15416.

A74-27173 Maximum treadmill exercise test in patients with abnormal control electrocardiograms. J. W. Linhart and H. B. Turnoff (Hahnemann Medical College and Hospital, Philadelphia, Pa.). *Circulation*, vol. 49, Apr. 1974, p. 667-672. 38 refs.

The study shows that maximum treadmill exercise studies are feasible and safe in patients with abnormal resting electrocardiograms including patients studied at least three months following an acute myocardial infarction. The specificity of the exercise electrocardiogram in patients with normal resting electrocardiograms was even better, and the sensitivity as good as in some other reports, probably because a maximum stress test was employed. In patients with abnormal resting tracings, on no drugs other than nitroglycerin, the correlation with other studies was also good, indicating the validity of this exercise protocol in these subjects. F.R.L.

A74-27174 Right atrial volume measurements from biplane cineangiocardiography - Methodology, normal values, and alterations with pressure or volume overload. T. P. Graham, Jr., G. F. Atwood, S. L. Faulkner, and J. H. Nelson (Vanderbilt University, Nashville, Tenn.). *Circulation*, vol. 49, Apr. 1974, p. 709-716. 11 refs. Research supported by the Tennessee Heart Association; Grant No. NIH-HL-14454-02.

A74-27175 The rate of change of left ventricular volume in man. I, II. K. E. Hammermeister, R. C. Brooks, and J. R. Warbasse (U.S. Public Health Service Hospital, Baltimore, Md.; U.S. Veterans Administration Hospital, Denver, Colo.). *Circulation*, vol. 49, Apr. 1974, p. 729-747. 37 refs. Grants No. NIH-HE-07221; No. PHS-AY-70-22. USVA Project 4-71.

The rate of left ventricular volume change (dV/dt) is by definition left ventricular ejection rate during systole and filling rate during diastole, and in the absence of valvular regurgitation or intracardiac shunts, is equal to systolic aortic valve flow and diastolic mitral valve flow respectively. A computerized technique for the calculation of instantaneous left ventricular dV/dt from cineangiographically measured left ventricular volume is presented. Because there is little quantitative information about the hemodynamics of left ventricular diastolic events in man, single-plane cineangiographic left ventricular volume curves were quantitatively analyzed at 16.6 msec intervals to evaluate the rate and amount of left ventricular filling during the early passive stage of filling, and during the time of atrial contraction. F.R.L.

A74-27200 Estimation of maximal aerobic power using stairclimbing - A simple method suitable for industry. E. Kamon and N. L. Ramanathan (Pittsburgh, University, Pittsburgh, Pa.). *American Industrial Hygiene Association Journal*, vol. 35, Apr. 1974, p. 181-188. 12 refs. U.S. Department of the Interior Grant No. G0122025; Contract No. N00014-67-A-0402-0009.

Data on the energy cost and heart rate of diverse Indian and U.S. subjects for stairclimbing, with or without external loads in both paced and unpaced manners, have been used to establish relations between metabolic costs, speeds of ascent and heart rates. A technique for estimating the maximum metabolic capacity from the heart rate of an individual climbing stairs at his own free pace has been presented. Formulae for deriving the maximum work capacity from the heart rate for different age groups are given. (Author)

A74-27212 # Performance and time zone flights (Leistung und Zeitzonenflüge). I. Lehwess-Litzmann. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 10, no. 1, 1974, p. 50-54. In German.

The body of man is governed by various biological cycles which are disrupted when he travels across many time zones in a short period of time, as is done by aircraft crews on long distance flights. This results in a decrease of performance ability unless extra resting time is granted before making another flight. An ICAO formula is

discussed, according to which the minimum necessary resting time is calculated as a function of the flight time, the number of time zones crossed, and the local times of departure and arrival. For a flight from New York to Tokyo, this resting time would come to two and a half days. P.T.H.

A74-27230 Physiological strain during light exercise in hot-humid environments. K. B. Pandolf, R. R. Gonzalez, and A. P. Gagge (John B. Pierce Foundation Laboratory; Yale University, New Haven, Conn.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 359-365. 18 refs. Grant No. NIH-ES-00354.

Physiological strain, measured by skin and esophageal temperatures, heart rate (HR) and skin evaporative heat loss, forearm sweat rate, and skin conductance, was compared at 25, 32 and 40 C ambient. Six unacclimated males did bicycle ergometer exercise for 30 to 40 min at 25% maximal oxygen uptake during which humidity was constant (10 torr) or increased steadily toward saturation. For low humidity, HR rose 1 beat/min per deg C elevation above 25 C. For increasing humidity, heart rate rose 2 to 4 beats/min for each deg C above 25 C ambient without thermal equilibrium. With rising humidity, esophageal and skin temperatures rose at a greater rate than for low humidity; the fraction of secretory sweat, effective as evaporative cooling, was limited by excessive wetting on exposed skin surface. (Author)

A74-27231 Motion sickness incidence as a function of the frequency and acceleration of vertical sinusoidal motion. J. F. O'Hanlon and M. E. McCauley (Human Factors Research, Inc., Goleta, Calif.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 366-369. 15 refs. Contract No. N00014-73-C-0040.

A74-27232 Permeability of alveolar-capillary membrane in oxygen poisoning. M. Valimaki, J. Kivisaari, and J. Niinikoski (Turku, University, Turku, Finland). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 370-374. 14 refs. Grant No. DAJA37-73-C-2681.

Sequences of exudation into the pulmonary interstitium and intra-alveolar space were investigated in rat lungs at stipulated intervals during 60 hours of exposure to oxygen and after resumption to air breathing. 125-I-polyvinylpyrrolidone was injected in a dose of 25 microcuries into the tail vein. Four hours after the injection the animals were killed and endobronchial washings carried out. Accumulation of the tracer, which behaves like albumin, was assessed in blood, endobronchial extracts, pulmonary interstitium, and pleural fluid by crystal scintillation counting. After 48 hours of oxygen breathing a severe pulmonary edema developed, and during the 60-hour exposure 30% of the animals died. At this phase the activities of 125-I-polyvinylpyrrolidone in lung interstitium and endobronchial extracts showed manyfold increases. (Author)

A74-27233 Effect of hyperbaric exposure at 9.6 ATA /N2-O2/ and fast decompression on sphingoglycolipids of rat liver, plasma, and red blood cells. T. K. Yang, H. M. Jenkin, R. K. Keck, Jr., and R. E. Danziger (Minnesota, University, Austin, Minn.; National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 375-379. 32 refs. Research supported by the Hormel Foundation; Contract No. N00014-67-0113-0011; NR Project 108-844; Navy Task MF51,524,014-9007.

A74-27234 * Value of exercise at one-half earth gravity in preventing the deconditioning effects of simulated weightlessness. J. Hoche and A. Graybiel (U.S. Naval Aerospace Medical Center, Pensacola, Fla.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 386-392. 14 refs. NASA Order T-5904-B.

A74-27235 Examination of the cornea following exposure to microwave radiation. R. J. Williams and E. D. Finch (National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 393-396. 9 refs. Navy Task MF51,524,015,0016BE7.

This study was designed to detect alterations in the corneas of rabbits caused by multiple exposure to either 2450 MHz continuous wave or 2860 MHz pulsed radiation at an average power field density of 225 mW/sq cm. Hematoxylin and eosin stained sections of corneas were examined. In some cases, the pattern of tritiated thymidine uptake into corneal cells was evaluated by autoradiography. Radiation did not appear to influence the normal cornea or the healing process in the wounded cornea. (Author)

A74-27236 Thermal radiation protection by lateral heat dissipation. I - Small-scale laboratory study. M. A. Chanta and A. M. Stoll (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 400-402.

A74-27237 Thermal radiation protection by lateral heat dissipation. II - Full-scale laboratory study. J. R. Piergallini and A. M. Stoll (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 403-406.

A74-27238 Transmission of angular acceleration to the head in the seated human subject. G. R. Barnes and B. H. Rance (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 411-416. 7 refs.

Sinusoidal angular oscillation in yaw of seated human subjects, both restrained and unrestrained, has demonstrated that responses of significant amplitude may be elicited in all three head axes. In the unrestrained condition, the torso appeared to absorb the input acceleration, the response of the head in the yaw axis exhibiting very rapid attenuation (5 log units/decade) and large phase lags at frequencies above 4 Hz. In the restrained condition, the transmission to the yaw axis of the head was much less severely attenuated (1 log unit/decade) with smaller phase lags above 4 Hz. The yaw responses in the unrestrained condition exhibited a resonant peak at 2 Hz, probably attributable to the large mass of the shoulders and torso. In both experimental conditions there was a significant response in both the roll and pitch axes of the head. (Author)

A74-27239 Excretion of lactic acid by rats exposed to simulated high altitude. W. S. Myles and M. W. Radomski (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 422-424. 26 refs.

Plasma and urinary levels of lactic acid were measured in rats exposed to simulated altitudes of 18,000, 24,000, and 26,000 ft for 6-hr periods. Acute exposure (6 hr) to 18,000 ft did not alter the basal level of lactic acid excretion but 5-fold and 50-fold increases were found in animals after 6 hr at 24,000 and 26,000 ft, respectively. A large interindividual variability in lactic acid excretion was observed at 24,000 and 26,000 ft with values ranging from 4 to 1000 mg/25 mg urinary creatinine. Injection of adrenalin increased urinary lactate levels at altitude, whereas prior fasting eliminated altitude-induced increases in lactic acid. It is suggested that, at altitude, lactic acid formation from liver glycogen is, in part, mediated by increased adrenalin secretion and that when blood lactate exceeds a critical level (14 to 19 mg%), lactic acid increases in the urine. (Author)

A74-27240 * Plasma volume and blood constituent shifts during +Gz acceleration after bedrest with exercise conditioning. W. van Beaumont, J. E. Greenleaf, H. L. Young, and L. Juhos (NASA, Ames Research Center, Moffett Field, Calif.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 425-430. 25 refs.

A74-27241 * Effects of hypercapnia and bedrest on psychomotor performance. W. F. Storm and C. L. Giannetta (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol.

45, Apr. 1974, p. 431-433. 11 refs. NASA Order T-74392.

Two weeks of continuous exposure to simulated weightlessness (bedrest) and/or an elevated (30 torr) CO2 environment had no detrimental effect on complex tracking performance, eye-hand coordination, or problem-solving ability. These results were consistent with previously reported behavioral findings which investigated these two factors only as independent stressors. (Author)

A74-27242 **Cardiological aspects of the aging pilot.** D. Durrer (Amsterdam, Universiteit, Amsterdam, Netherlands). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 438-442. 10 refs.

Review of the influence of the aging process on the heart, with particular reference to the detection of heart disease in the aging pilot. Some aspects of the aging process studied in several experimental models are reviewed, and the specificity of the age-induced changes of the heart and circulation is discussed. The relation between the workload of the pilot and the influence of aging is considered, taking into account such psychological stresses as acute emotional factors, emotional factors of a chronic nature, and static exercise. The problem of timely detection of hypertension and coronary heart disease in pilots is discussed, noting the relation between abnormal plasma lipid levels and accelerated atherosclerosis and the effects of nicotine and alcohol on the cardiovascular system. A.B.K.

A74-27243 **Quantitative exercise electrocardiography in the evaluation of patients with early coronary artery disease.** F. Yanowitz, V. F. Froelicher, Jr., N. Keiser, and M. C. Lancaster (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 45, Apr. 1974, p. 443-448. 11 refs.

A74-27311 **Continuous exposure of chicks and rats to electromagnetic fields.** A. J. Giarola and W. F. Krueger (Texas A & M University, College Station, Tex.). *IEEE Transactions on Microwave Theory and Techniques*, vol. MTT-22, Apr. 1974, p. 432-437. 12 refs.

Growth rate and feed consumption depressions were observed in groups of 25 day-old male chicks when exposed in metal cage environments to the following CW fields: (1) a UHF wave at 880 MHz in a very low-Q cavity resonator energized by a 220-mW power source; (2) a VHF wave at 260 MHz in a very low-Q cavity resonator energized by a 220-mW power source; (3) an ELF electric field at either 45 or 60 Hz with calculated electric field strength of 3500 V/m; and (4) an ELF magnetic field at either 45 or 60 Hz with 1.3 G. Adrenal glands of chicks exposed to the 880-MHz wave were compared with those from control chicks. Smaller adrenals were observed in the treated group of birds. Growth depression was also observed in rats exposed to the UHF field at 880 MHz. Mean adrenal weights of the treated and control rats did not differ significantly. However, spleen and thymus weights of the treated rats were notably larger. Potential causes of the growth responses observed are discussed. (Author)

A74-27312 **A microwave decoupled brain-temperature transducer.** L. E. Larsen (Methodist Hospital; Baylor University, Houston, Tex.), R. A. Moore, and J. Acevedo (Westinghouse Electric Corp., Baltimore, Md.). *IEEE Transactions on Microwave Theory and Techniques*, vol. MTT-22, Apr. 1974, p. 438-444. 17 refs.

The measurement of brain temperature during moderate to high level exposure to microwave radiation is considered. Bench test studies of conventional temperature transducers in microwave environments have demonstrated artifacts responsible for errors of several degrees centigrade. These findings led to a program for the development of systematic test procedures and the design of electrodes with artifact reduced to 0.1 deg C. M.V.E.

A74-27345 # **Catalysis applications in spacecraft life support systems (Zastosuvannia katalizu v sistemakh zhittezabezpechennia kosmichnikh aparativ).** Ia. B. Gorokhovats'kii. *Akademiia Nauk* hygiene considerations, housekeeping needs, clothing, communications, and maintenance potential. M.V.E.

A74-27347 # **Physico-physiological foundation of the zonal rheography of the lung (Fiziko-fiziologichne obgruntuvannia zonal'noi reografii legen').** O. S. Mamolat, L. I. Zhukovs'kii, and Iu. O. Frinerman. *Akademiia Nauk Ukrains'koi RSR, Visnik*, vol. 38, Jan. 1974, p. 50-56. 31 refs. In Ukrainian.

Discussion of the theoretical basis of zonal pulmonary rheography as a technique for determining the distribution of ventilation volumes and blood circulation volumes in individual sections of lungs. Expressions are given for a mathematical description of the physiological and physical processes involved. V.Z.

A74-27350 **Aerospace pathology.** Edited by J. K. Mason (RAF, London, England) and W. J. Reals (St. Joseph Hospital and Rehabilitation Center, Wichita, Kan.; USAF, Washington, D.C.). Chicago, College of American Pathologists Foundation, 1973. 237 p. $15.

Procedure for autopsy and coroner's investigation following aircraft accidents in England and Wales, the determination of carboxyhaemoglobin and its importance in aviation accidents, and physiological and psychological investigations of fatal accidents are among the topics covered in papers concerned with with aerospace pathology. Other topics covered include international and domestic aspects of aircraft accident investigation, legal aspects of autopsy of aircraft-accident victims in the United States, and the role of the forensic dentist in aircraft accidents. M.V.E.

A74-27351 **His bundle electrogram during coronary arteriography in man - Studies at spontaneous and constant heart rates.** F. K. Nakhjavan, H. Goldberg (Albert Einstein Medical Center; Temple Medical School, Philadelphia, Pa.), A. M. Smith, and M. B. Dratch. *Journal of Electrocardiology*, vol. 7, Apr. 1974, p. 101-107. 8 refs.

His bundle electrograms were obtained during selective coronary cineangiography in ten patients at spontaneous and constant heart rates by right atrial pacing. The latter studies were performed to eliminate the effects of bradycardia on atrioventricular conduction at spontaneous heart rate. Sinus bradycardia (3 to 28 beats/min) occurred in seven patients during right coronary artery injection and in six patients during left coronary artery injection, while atrioventricular conduction delay (as reflected in prolongation of A-H interval on His bundle electrogram) occurred in four patients during left and right coronary artery injection. During constant heart rate, atrioventricular delay occurred in seven patients during left coronary artery injection and in four patients during right coronary artery injection. F.R.L.

A74-27352 **Severity and distribution of coronary artery disease in patients with normal resting electrocardiograms.** K. Redy, R. I. Hamby, J. Hilsenrath, F. Smithline, and I. Hoffman (Long Island Jewish-Hillside Medical Center, New Hyde Park; Queens Hospital, Jamaica; New York, State University, Stony Brook, N.Y.). *Journal of Electrocardiology*, vol. 7, Apr. 1974, p. 115-117. 10 refs.

Sixty-three patients with angiographically established coronary artery disease presented entirely normal resting electrocardiograms. Single vessel disease was present in 23 (35%) and double or triple disease in 40 (65%). The left ventriculogram was normal in 40 patients (65%) and abnormal in 23 (35%). The commonest left ventricular contractile defect noted was asyneresis (12) with akinesia noted in 8. The left anterior descending artery was the most frequently involved vessel (52) with the right coronary artery (33) and the left circumflex artery (29) somewhat less commonly affected. Widespread and severe coronary artery disease, usually involving two or three of the major coronary branches, is a very common finding in anginal patients presenting entirely normal resting electrocardiograms. F.R.L.

A74-27353 **The effect of acute alterations in blood sodium on the electrocardiogram.** T. C. Gibson (Vermont, Medical Center Hospital, Burlington, Vt.), K. Sugioka, and M. Sugioka (North Carolina, University, Chapel Hill, N.C.). *Journal of Electrocardiology*, vol. 7, Apr. 1974, p. 127-136. 23 refs. Grant No. PHS-B-2798.

Experiments were designed to induce hypernatremia and hyponatremia acutely in the intact dog for the purpose of establishing associated electrocardiographic changes. Blood sodium levels were measured simultaneously and continuously by a stable sodium sensitive glass electrode system. Elevation of blood sodium, averaging 41% above the original level, resulted in diminution in amplitude of P and QRS, an increase in the QT/RR ratio, and divergence of mean T frontal vector from the mean QRS frontal vector. Additional changes were a slight fall in serum potassium, a fall in pH, and a fall in mean blood pressure. Electrocardiographic changes took place when there had been only a 5 to 15% elevation in blood sodium levels. F.R.L.

A74-27495 **Lateral /-Gy/ impact tests with inflatable restraint systems for Air Force crew escape module applications.** J. T. Shaffer and J. W. Brinkley (USAF, Aerospace Medical Div., Wright-Patterson AFB, Ohio). *Society of Automotive Engineers, Automotive Engineering Congress, Detroit, Mich., Feb. 25-Mar. 1, 1974, Paper 740043.* 9 p. 8 refs. Members, $1.25; nonmembers, $2.00. USAF-sponsored research.

A74-27498 **A systems engineering evaluation of passive restraint systems for crash-impact attenuation in air transport aircraft.** D. H. Robbins and R. G. Snyder (Michigan, University, Ann Arbor, Mich.). *Society of Automotive Engineers, Automotive Engineering Congress, Detroit, Mich., Feb. 25-Mar. 1, 1974, Paper 740044.* 19 p. 25 refs. Members, $1.25; nonmembers, $2.00. Contract No. F33651-71-C-1078.

A74-27516 # **Survivability of microorganisms in space and its impact on planetary exploration.** M. Frankenberg-Schwager and H. Bücker (Arbeitsgruppe für biophysikalische Raumforschung, Frankfurt am Main, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, International Symposium on Planetary Exploration, Heidelberg, West Germany, Feb. 15, 16, 1974, Paper.* 13 p. 13 refs.

Experiments conducted with microbial samples show that the effect of the space environment is in most cases not sufficient to kill the whole population of exposed terrestrial microorganisms. UV radiation was found to be the main lethal factor of the space environment. Terrestrial microorganisms have a good change of survival in space if they are protected against UV radiation by means of metal foils or dust particles. The survival of terrestrial microorganisms is not restricted by low temperatures but can be affected by high temperatures. Microorganisms under vacuum conditions show an increased heat resistance. G.R.

A74-27550 **Maximum oxygen consumption and heat loss facilitation in small homeotherms by He-O2.** M. Rosenmann and P. Morrison (Alaska, University, Fairbanks, Alaska). *American Journal of Physiology*, vol. 226, Mar. 1974, p. 490-495. 36 refs. Grants No. NIH-GM-10402; No. NIH-RR-00518.

The high thermal conductance of an 80% He-20% O2 atmosphere was used to elicit maximum metabolism in moderate cold in species ranging from 7-g pygmy mice (Baiomys taylori) to 250-g white rats, including redpolls (Acanthis flammea), two vesper mice (Calomys ducilla, C. callosus), tundra voles (Microtus oeconomus), and four strains of Mus musculus. Values slightly exceeded those in similar animals using other methods to confirm the low metabolic ratio in rodents. Submaximal values at higher temperatures defined thermal conductance in He-O2 and air. In different species the ratios of these conductances ranged from 1.4 to 2.6, differences which relate to the extent and quality of the respective insulation. Maximum metabolism was obtained at a temperature 13 to 70 C greater in He-O2 than required in air for the same metabolic effort. (Author)

A74-27562 **The effect of level of depth processing and degree of informational discrepancy on adaptation to uniocular image magnification.** W. Epstein and C. L. Morgan-Paap (Wisconsin, University, Madison, Wis.). *Journal of Experimental Psychology*, vol. 102, Apr. 1974, p. 585-594. 22 refs. Grant No. PHS-MH-16390.

The Ss adapted to uniocular image magnification which transformed the preexperimental relationship between objective depth slant and retinal disparity. The adaptation treatment consisted of continuous inspection of a single luminous figure representing for different Ss three different degrees of perspectival slant. Two levels of depth processing were contrasted: depth registration - an activity which diverted S from active utilization of depth information - and depth processing - an activity that required frequent utilization of depth information. The magnitude of adaptation was found to increase as the discrepancy between perspectival and stereoscopic slant increased and to be greater following depth processing than following depth registration. The results were discussed in the context of an account of adaptation which stresses resolution of informational discrepancy. Other findings in the literature were reinterpreted in the light of the current experiments. (Author)

A74-27563 * **Feedback precision and postfeedback interval duration.** C. A. Rogers, Jr. (Arizona, University, Tucson, Ariz.). *Journal of Experimental Psychology*, vol. 102, Apr. 1974, p. 604-608. 9 refs. Research supported by Tulane University; Grant No. NGR-03-002-091.

Precision of feedback gain was manipulated in a simple positioning task. An optimum was found; an increase in precision past that optimum produced deleterious effects upon rate of acquisition. In a second study, increasing postfeedback interval removed that optimum. The feedback precision effects were then replicated in a timing task. The combined results of the 3 studies were interpreted as supportive of an information-processing approach to the study of postfeedback interval events for simple motor skills. The findings additionally supported specific predictions by Bilodeau and deductions from Adams' 1971 theory of motor learning. (Author)

A74-27564 **Interactions and range effects in experiments on pairs of stresses - Mild heat and low-frequency noise.** E. C. Poulton and R. S. Edwards (Medical Research Council, Applied Psychology Unit, Cambridge, England). *Journal of Experimental Psychology*, vol. 102, Apr. 1974, p. 621-628. 26 refs.

A74-27565 **Tactile apparent movement - The effects of interstimulus onset interval and stimulus duration.** J. H. Kirman (Queens College, Flushing, N.Y.). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 1-6. 9 refs. Grant No. PHS-2-R01-NS-06205.

The effects of variations in stimulus duration and interstimulus onset interval on ratings of tactile apparent movement were determined for seven Ss with stimulators of very small diameter. Judgments of successiveness and simultaneity were also obtained. It was found that apparent movement increased as a power function of increases in stimulus duration. The function relating tactile apparent movement and stimulus duration was shown to be similar to that obtained by Kolers (1964) for visual apparent movement. Interstimulus onset interval also had a marked effect on apparent movement, and the optimal interval was influenced by stimulus duration in a manner similar to that reported by Sherrick and Rogers (1966). (Author)

A74-27566 **Effects of a contralateral interference tone on auditory recognition.** E. Cudahy and B. Leshowitz (Arizona State University, Tempe, Ariz.). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 16-20. 9 refs. USAF-supported research; Grant No. PHS-MH-20301.

The effects of a contralateral interference tone on identification of the frequency of a brief signal were investigated. The signal was a 20-msec sinusoid and was the same intensity as the 500-msec interference tone. Changes in frequency discrimination were measured as a function of the temporal interval between signal and interference tone. Frequency discrimination was unaffected by the presence of a leading interference tone. However, the addition of a trailing interference tone produced a small (about 15%) decrement in performance relative to discriminability measured in quiet. In contrast to the data and supporting theory of Massaro (1970), percent correct identification did not vary appreciably with intertone interval. The present data suggest that interference effects previously obtained with untrained Os are greatly attenuated for well-practiced Ss. (Author)

A74-27567 **Successiveness discrimination - Two models.** L. G. Allan and A. B. Kristofferson (McMaster University, Hamilton, Ontario, Canada). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 37-46. 5 refs. National Research Council of Canada Grants No. A-8260; No. A-7919.

Two models for successiveness discrimination, an attention-switching model and a duration-discrimination model, are described. Data are reported from a forced-choice successiveness discrimination task in which the standard stimulus assumed one of three values during a session. Of major interest is the ability of the models to account for the absence of observed variation in performance with changes in value of the standard. Conventional signal detection-type models or discrete state models would be unable to account for the data. (Author)

A74-27568 **Orientation-specific aftereffects and illusions in the perception of brightness.** R. Over, J. Broerse, B. Crassini, and W. Lovegrove (Queensland, University, St. Lucia, Australia). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 53-56. 18 refs.

Orientation-specific brightness aftereffects were found when vertical and horizontal gratings of the same space-average luminance were viewed following alternate exposure to vertical and horizontal gratings that differed in space-average luminance. The vertical test grating appeared bright following exposure to a dim vertical grating, and dim after a bright vertical grating had been viewed. This aftereffect did not occur when the adaptation gratings had been seen by one eye and the test gratings by the other eye. An orientation-specific illusion in the perception of brightness was also found, with the white sectors of a vertical grating appearing brighter against a background of horizontal lines than they did against a background of vertical lines. Both distortions imply that there are detectors in the human visual system that are conjointly tuned to luminance and contour orientation. (Author)

A74-27569 **Frequency thresholds for two-flash flicker and critical flicker - Why they differ.** R. M. Herrick (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 79-82. 12 refs.

The minimum interval detectable between two successive flashes is longer than the minimum interval detectable when many flashes are viewed. The probability summation hypothesis is suggested to explain the difference. For a given flash duration, the minimum interval detectable decreases as a function of the number of flashes, n, until n equals about 8 or 10; further increases in n cause no further changes in this interval. Of the total decrease in the interval, from n = 2 to n = 99, about 90% is explained by the probability summation hypothesis. (Author)

A74-27570 **Some aspects of perceptual coding of duration in visual duration discrimination.** L. G. Allan, A. B. Kristofferson, and M. E. Rice (McMaster University, Hamilton, Ontario, Canada). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 83-88. 23 refs. National Research Council of Canada Grants No. A-8260; No. A-7919.

Data are presented which indicate two major differences between duration discrimination performance and discrimination performance usually observed in other psychophysical tasks. A decrement in duration discrimination performance with increasing temporal delays between the presentation of two successive stimuli was not found, and the usual difference in level of performance between forced-choice and single-stimulus tasks was not observed. The time-order error in duration discrimination is also discussed. (Author)

A74-27571 **Detecting target elements in multielement arrays - A confusability model.** R. A. Kinchla (Princeton University, Princeton, N.J.). *Perception and Psychophysics*, vol. 15, Feb. 1974, p. 149-158. 22 refs.

Consideration of the general perceptual problem of evaluating multielement stimulus arrays for the presence of certain critical elements. A 'reductive coding' model for the detection of critical elements in multielement arrays, originally applied to auditory data, is shown to provide an interpretation of 'set size' and 'redundant critical element' effects in visual letter detection data. M.V.E.

A74-27587 **Neuronal activity during eye movements in a visual association area of cat cerebral cortex.** M. Straschill and F. Schick (Max-Planck-Institut für Psychiatrie, Munich, West Germany). *Experimental Brain Research*, vol. 19, Mar. 29, 1974, p. 467-477. 30 refs. Research supported by the Deutsche Forschungsgemeinschaft.

Experimental study of the effect of saccadic eye movements on single neurons from the anterior part of the middle suprasylvian gyrus (AMSS) in awake nonparalyzed cats. The incidence of neurons which responded in synchrony with saccades in the presence of a stationary pattern is found to be high (81%) in the AMSS in comparison to 10% in the visual cortex. In this group of neurons two types of saccade-associated responses are distinguished - namely, a type which discharges prior to or simultaneously with the onset of saccades, and a type which discharges subsequent to the onset of the saccades after latency periods of different lengths. A.B.K.

A74-27588 **Function and interaction of on and off transients in vision. I, II.** W. A. Phillips (Stirling University, Stirling, Scotland) and W. Singer (Max-Planck-Institut für Psychiatrie, Munich, West Germany). *Experimental Brain Research*, vol. 19, Mar. 29, 1974, p. 493-521. 58 refs. Research supported by the Deutsche Forschungsgemeinschaft.

Results of psychophysical experiments carried out to determine the conditions under which human observers can detect small differences between two successively presented random-dot patterns. It is found that the transient neural response to the onset of a stimulus is significantly affected by the offset of that stimulus within the preceding 120 msec, and that the transient neural response to the offset of a stimulus is significantly affected by the onset of that stimulus within the following 60 msec. It is suggested that reciprocal inhibition between on- and off-activity could account for these results. It is shown that the neuronal reactions of cats are reflected in detail by the ability of humans to detect appearances and disappearances that occur during interruptions. EPSP sequences recorded from lateral geniculate nucleus (LGN) relay cells and relay cell responses conditioned by reticular stimulation suggest that the differentiation of responses to interruption and change partially occurs in the retina. This differentiation is subsequently enhanced by antagonistic inhibition in the LGN. A.B.K.

A74-27600 * **Peptide formation mediated by cyanate.** J. J. Flores (NASA, Ames Research Center, Planetary Biology Div., Moffett Field, Calif.) and J. O. Leckie (Stanford University, Stanford, Calif.). *Nature*, vol. 244, Aug. 17, 1973, p. 435-437. 25 refs.

An investigation has been conducted to find out whether peptide formation can be enhanced by cyanate added to hydroxyapatite or orthophosphates. The results show that diglycine is formed when glycine is heated in the presence of apatite or orthophosphates.

The addition of inorganic cyanate increases the yields of diglycine but its action as a condensing agent extends only to some of the orthophosphates studied. G.R.

A74-27613 # **Effect of fastigial nucleus stimulation on conditioned-reflex and delayed-response behavior (Vliianie razdrazheniia fastigial'nogo iadra na uslovnoreflektornuiu deiatel'nost' i otsrochennye reaktsii).** G. L. Bekaia and Ts. G. Suknidze (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol. 73, Jan. 1974, p. 173-175. 15 refs. In Russian.

A74-27621 # **The reaction of a generalized motor activation in man (O reaktsii generalizovannoi motornoi aktivatsii u cheloveka).** M. S. Zalkind and V. Iu. Shlykov (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Neirofiziologiia,* vol. 6, Jan.-Feb. 1974, p. 19-25. 45 refs. In Russian.

The effect of short auditory and visual stimulations on the T- and H-reflexes was studied in human subjects. Both test reflexes showed two periods of increased amplitude and dispersion which diminished upon repetition of the stimulus. The two response components differed from each other in their duration, the gap between gamma and alpha activation, and habituation rate. It is suggested that the first component is determined by the influence of the pyramidal message from the motor cortex, while the second is determined by the influence of the efferent message from the primary projective zones of the cortex through the reticulo-spinal pathways. P.T.H.

A74-27622 # **Physical modeling of neuronal memory as a mosaic of chemo- and electroreceptive elements of the somato-dendritic membrane (Fizicheskoe modelirovanie neironnoi pamiati kak mozaiki khemo- i elektroretseptivnykh elementov somato-dendritnoi membrany).** A. N. Radchenko (Leningradskii Politekhnicheskii Institut, Leningrad, USSR). *Neirofiziologiia,* vol. 6, Jan.-Feb. 1974, p. 90-98. 9 refs. In Russian.

A74-27636 **Simulation of the motion of the heart.** I. Tomek (Alberta, University, Edmonton, Canada). *Simulation,* vol. 22, Mar. 1974, p. 76-80. 9 refs.

A linearized model is presented for the simulation of cardiac motion. The heart is regarded as a body with two cavities representing the combined atria and ventricles, respectively. This body is coupled to the frame, representing the chest, by viscoelastic elements. The following dynamic effects are considered as contributing to the motion of the heart: (1) the blood flowing through various outlets; (2) the changing distribution of the mass of the heart; and (3) the tissue surrounding the heart. These factors act upon a heart assumed to have six degrees of freedom. The model can serve as a basis of simulation of practical importance for deeper understanding of phenomena observed in ballistocardiography and apexcardiography. P.T.H.

A74-27769 **Laser-interferometric and Mössbauer-spectroscopic study of the principles of operation of the inner ear (Laserinterferometrische und Mössbauer-spektroskopische Untersuchung der Funktionsweise des Innenohrs).** W. Helfenstein, W. Ruegg, and W. Willi (Eidgenössische Technische Hochschule, Zurich, Switzerland). *Laser/Elektro-Optik,* vol. 6, Mar. 1974, p. 16, 18, 19, 22, 23. 11 refs. In German. Research supported by the Schweizerischer Nationalfonds zur Förderung der Wissenschaftlichen Forschung.

The synchronous determination of the temporal characteristics of the input and the output signal is an important problem in a study of the transmission function of the mechanical part of the cochlea. Difficulties regarding the conduction of such measurements are connected with the small vibrational amplitudes involved and the requirement that the interference with the operation of the cochlea during the measurements must be negligible. An approach used for overcoming these difficulties makes use of a laser interferometer and Mössbauer spectroscopy. Details regarding the experimental equipment are discussed together with aspects concerning the conduction of the experiments. The data obtained in the measurements were processed on a computer. G.R.

A74-27850 # **Effect of ACTH on the protein and sulfhydryl group contents in various sections and subcellular fractions of the brain (Vpliv AKTG na vmist bilka ta sul'fgidril'nikh grup v riznikh viddilakh ta subklitinnikh fraktsiiakh golovnogo mozku).** L. M. Kalins'ka and A. Ia. Mestechkina (Kiivs'kii Nauchno-Doslidnii Institut Endokrinologii ta Obminu Rechovin, Kiev, Ukrainian SSR). *Akademiia Nauk Ukrains'koi RSR, Dopovidi, Seriia B - Geologiia, Geofizika, Khimiia i Biologiia,* vol. 36, Jan. 1974, p. 80-83. In Ukrainian.

A74-27914 **Visual and auditory perception.** G. M. Murch (Portland State University, Portland, Ore.). Indianapolis, Bobbs-Merrill Co., Inc., 1973. 416 p. 823 refs. $6.50.

The present work provides an introduction to the area of psychology called perception. It attempts to interrelate the classical, phenomenological approaches of the earlier perceptual scientists with the empirical approach of the newer generation. The research discussed is presented in terms of a model of the perceptual process; this model is very general, yet it provides a framework through which new questions about perception can be generated. Topics covered include the perception of color; figure-ground segregation; visual acuity; visual and auditory short-term storage; the microgenesis and ontogenesis of perception; pattern recognition; the organization of auditory perception (pitch, loudness, and tone quality); the perception of spatial relations; geometric illusions; figural aftereffects; and the perception of motion, causality, and time. P.T.H.

A74-28013 **Muscle metabolites and oxygen deficit with exercise in hypoxia and hyperoxia.** D. Linnarsson, J. Karlsson, L. Fagraeus, and B. Saltin (Kungl. Karolinska Institutet; Gymnastik- och Idrottshogskolan, Stockholm, Sweden). *Journal of Applied Physiology,* vol. 36, Apr. 1974, p. 399-402. 21 refs. SMRC Project 40X-682; SMRC Project 40X-2203.

Six healthy males performed a submaximal work test for 4 min and short-term maximal exercise on a bicycle ergometer at 0.68, 1.00, and 1.40 atm (abs), breathing air. Muscle biopsies were taken before and immediately after each work test from the thigh muscles, and ATP, CP, glycogen, glucose, G-6-P, pyruvate, and lactate were determined. At submaximal exercise oxygen deficit, phosphagen depletion and muscle lactate accumulation were inversely related to inspired oxygen tension. At maximal exercise oxygen deficit, phosphagen depletion and muscle lactate accumulation were independent of oxygen tension, whereas performance time and maximal O2 uptake increased with oxygen tension. It was concluded that, within the pressure range studied, oxygen tension had a significant influence on aerobic and anaerobic metabolism and that the rate of lactate formation during the first minutes of exercise was inversely related to the availability of molecular oxygen. (Author)

A74-28014 **Heat acclimation and decline in sweating during humidity transients.** R. R. Gonzalez, K. B. Pandolf, and A. P. Gagge (Yale University, New Haven, Conn.). *Journal of Applied Physiology,* vol. 36, Apr. 1974, p. 419-425. 28 refs. Grant No. NIH-ES-00354.

Six unclothed male subjects exercised on a bicycle ergometer in constant 40 C ambient temperatures with high air movement, while ambient vapor pressure was increased from 12 to 49 torr. Experiments were conducted on six consecutive days. Whole-body, local forearm sweating, and local chest conductance were recorded. Increasing humidity raised heart rate, esophageal temperature, and skin temperature to identical maximal levels each day. Total and local sweating increased progressively during each daily exposure. Excessive skin wetting during the last half of the humidity

experiments depressed whole body sweating. Plots of forearm sweating vs esophageal temperature showed increasing sweat secretion rates at lower esophageal temperature (postacclimation) with no change in slope (gain). Chest conductance, plotted as a function esophageal temperature, was 25 to 30% higher at postacclimation. (Author)

A74-28015 Effect of high fluid intake on the renal concentrating mechanism of normal man. C. A. Vaamonde (New Mexico, University, Albuquerque, N. Mex.), J. I. Presser (Miami Veterans Administration Hospital, Miami, Fla.), and W. Clapp (Miami, University, Miami, Fla.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 434-439. 21 refs. U.S. Veterans Administration Grants No. 11-69; No. 13-69; Grant No. NIH-HE-12544.

The rapidity of onset of the impaired maximal urine concentration resulting from ingestion of large amounts of fluid was studied in eight normal subjects. The urine concentration was measured after 19 hours of hydropenia and 500 mU of aqueous vasopressin (intravenous). Reproducibility of control maximal urine concentration measurements was excellent: the change in five repeated studies ranged from -58 to 64 mosmol/kg H2O. After control maximal urine concentration the subjects ingested 100 ml water/kg body weight per day during either 24 hr or 48 hr and maximal urine concentration measurements were repeated thereafter. Mean maximal urine concentration decreased from 1129 plus or minus 28 (control) to 991 plus or minus 55 mosmol/kg H2O after 24 hours of hydration and from 1209 plus or minus 74 (control) to 851 plus or minus 71 mosmol/kg H2O after 48 hours of water loading. These data demonstrate that 24 hours of forced hydration are sufficient to modestly impair maximal urine concentration, and that the defect in maximal urine concentration is greater after 48 hours (a 30% decrease) than after 24 hours (a 12% decrease) of forced hydration. (Author)

A74-28016 Metabolism and heat losses of resting man in a hyperbaric helium atmosphere. J. Timbal, H. Vieillefond, H. Guenard, and P. Varene (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne; Compagnie Maritime d'Expertise, Marseille, France). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 444-448. 22 refs. Research supported by the Centre d'Essais en Vol.

The different factors affecting the thermal balance in human subjects were measured in a pressure chamber at 1.5, 2.3, 4.4, 8.4, 16.1, and 30.8 atm. Ambient temperature was adjusted to ensure thermal comfort. Metabolism was computed from oxygen consumption measured in an open circuit during three periods of 10 min, at each level and for each subject, nude and supine, at rest. Heat losses by radiation were calculated from mean skin temperature and wall temperature changes in heat content from rectal temperature and mean skin temperature, and skin and respiratory evaporation from weight loss. Heat lost by respiratory convection was calculated from inspired and expired gas temperatures and ventilatory flow. From these data thermal loss by skin convection was deduced, and the convection coefficient of thermal exchange was established. No significant changes in oxygen consumption, expired CO2, and ventilatory flow. (Author)

A74-28017 Hypoxia and shivering thermogenesis in cold-acclimatized miniature pigs. C. M. Blatteis and T. M. Gilbert (Tennessee, University, Memphis, Tenn.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 453-456. 16 refs. Grant No. PHS-FR-05423.

Previous studies have suggested that the reduction by moderate hypoxic hypoxia of the metabolic response to cold might be accounted for by the selective depression of nonshivering thermogenesis (NST). Miniature pigs, even when cold-acclimatized, are alleged to lack NST. Their metabolic response to cold, therefore, should not be affected by moderate hypoxia. To test this hypothesis, four adult cold-acclimatized miniature pigs were exposed to 7 C for two hours while breathing either room air or 10% O2 (in N2). The results showed that the increase in O2 consumption produced by this duration and degree of cold was not different in both gaseous environments. The intensity of shivering which accompanied the increase in metabolic rate also was not different under both conditions. Colonic temperature remained unchanged throughout the cold exposure in both environments. The inability of these animals to develop large amounts of NST was inferred from their weak calorigenic response to the IV infusion of norepinephrine. (Author)

A74-28018 Cardiodynamic hyperpnea - Hyperpnea secondary to cardiac output increase. K. Wasserman, B. J. Whipp, and J. Castagna (California, University; Harbor General Hospital, Torrance, Calif.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 457-464. 25 refs. Grants No. PHS-HL-11907; No. PHS-HL-14967.

To determine if acute increases in cardiac output could increase ventilation by acutely reducing the ratio of ventilation to cardiac output, the latter was increased by intravenous isoproterenol or cardiac pacing. Minute ventilation and cardiac output were measured breath-by-breath and beat-by-beat, respectively, before and after abrupt increases in cardiac output in unanesthetized and anesthetized dogs. Isoproterenol injection resulted in hyperpnea occurring during the breath following the start of the cardiovascular effects. If the mechanism of the minute ventilation increase induced by isoproterenol was sensitization of peripheral chemoreceptors, a decrease in end-tidal CO2 would be expected. However, end-tidal CO2 usually increased slightly or did not change. Injection of isoproterenol into the cerebral circulation did not stimulate minute ventilation until there was evidence of recirculation to the heart. This isoproterenol-induced hyperpnea was not affected by 100% O2 breathing or carotid body removal. (Author)

A74-28019 * Energy exchanges of swimming man. E. R. Nadel, I. Holmer, U. Bergh, P.-O. Astrand, and J. A. J. Stolwijk (Gymnastik- och Idrottshogskolan; National Board of Occupational Safety and Health, Stockholm, Sweden; Yale University, New Haven, Conn.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 465-471. 22 refs. Research supported by the Swedish Sports Federation; Grants No. NIH-ES-00354; No. NGR-07-008-002.

Three male swimmers underwent 10-min resting and 20-min swimming (breaststroke) exposures in a swimming flume. Water temperatures in separate exposures were 18, 26, and 33 C. At each water temperature the subjects rested and swam at water velocities of 0.50, 0.75, and 0.95 m/sec, which were designed to produce around 40, 70, and 100% of maximal aerobic power. Measurements were made of esophageal temperature, four skin temperatures, water temperature, heat flow from five local skin surfaces (Hatfield-Turner disks), and oxygen uptake. Calculations were made of mean area-weighted skin temperature and heat flow, metabolic rate, and heat storage. Internal body temperature changes after 20 min of swimming were related to water temperature, swimming intensity, and body composition. (Author)

A74-28020 Heart rate responses of young and old rats to various levels of exercise. R. J. Barnard, H. W. Duncan, and A. T. Thorstensson (California, University, Los Angeles, Calif.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 472-474. 14 refs. Research supported by the American-Scandinavian Foundation; Grant No. PHS-GM-13242.

Heart rate data were obtained from young (210 g) and old (512 g) rats. Resting values of 381 plus or minus 8 and 331 plus or minus 6 beats/min were obtained for the young and old rats, respectively. During exercise, heart rates increased to 515 plus or minus 12 and 503 plus or minus 11 at the lightest work load of 13.4 m/min. Maximum heart rate values of 611 plus or minus 5 and 577 plus or minus 3 for the young and old rats were obtained at 53.6 m/nin. During an exhaustive run at 26.8 m/min, 10% grade, a steady-state heart rate of 554 plus or minus 5/min increased to 584 plus or minus 4/min at exhaustion. By 1 min of recovery the heart rate had decreased to 445 plus or minus 13 and then did not change significantly for the next 9 min. (Author)

A74-28021 **Integrated EMG and oxygen uptake during dynamic contractions of human muscles.** B. Bigland-Ritchie and J. J. Woods (Quinnipiac College, Hamden, Conn.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 475-479. 23 refs.

Integrated electrical activity (EMG) from the quadriceps muscles and oxygen uptake were measured simultaneously in three subjects during submaximal rates of positive (concentric) work performed on a motorized bicycle ergometer set at 50 rpm. Within the range of work rates measured (0 to 900 kg/min), where no mounting fatigue was likely, both integrated EMG and oxygen uptake were linearly related to the mean force exerted by the subject. The mean linear correlation coefficient for the EMG/force relationship was generally above 0.98, as were those for both the oxygen/force relationship and the oxygen/EMG relationship. These results therefore show that, during dynamic voluntary contractions for any given electrode placement, integrated EMG records can be used as a relative measure of the combined number of stimulus frequency of active muscle fibers employed. (Author)

A74-28022 **Hypoxic-hypercapnic interaction in human respiratory control.** G. D. Swanson and J. W. Bellville (California, University, Los Angeles, Calif.). *Journal of Applied Physiology*, vol. 36, Apr. 1974, p. 480-487. 22 refs. Research supported by the Crump Institute; Grants No. NIH-GM-12527; No. NIH-HL-15659; No. NIH-RR-00311.

The human ventilation response to an end-tidal CO2 sinusoidal perturbation was assessed during both normoxic and hypoxic conditions. The CO2 response gain as defined by the magnitude of the sinusoidal ventilation response divided by the magnitude of the end-tidal CO2 sinusoidal stimulus decreased as frequencies were increased from 0.1 to 4 cycles/min. The normoxic to hypoxic increase in gain was greater at the higher frequencies. When both end-tidal CO2 and end-tidal O2 were perturbed sinusoidally at a high frequency so as to cancel the ventilation response under hypoxic conditions, the relative influence of CO2 and O2 in determining the ventilation response in the human volunteer was found to be similar to that reported in the literature for anesthetized cat's carotid bodies. These results indicate that peripheral CO2-O2 interaction, presumably at the carotid body, is sufficient to explain hypoxic-hypercapnic interaction without a need for postulating hypoxic enhancement of the central chemoreceptor response. (Author)

A74-28059 **Metacontrast target detection under light and dark adaptation.** D. G. Purcell (Arkansas, University, Fayetteville, Ark.), A. L. Stewart (New York University, New York, N.Y.), and R. L. Brunner (Purdue University, Lafayette, Ind.). *Psychonomic Society, Bulletin*, vol. 3, Mar. 1974, p. 199-201. 10 refs. Research supported by the Social and Rehabilitation Service; National Research Council of Canada Grant No. APA-143; Grant No. NIH-NB-07622-02.

Two experiments investigated the influence of light and dark adaptation on forced-choice target detection under conditions of metacontrast. U-shaped masking functions were found under both adaptation conditions. The U minimum occurred at shorter delta t values under dark adaptation than under light adaptation. Light adaptation increased target detection under some conditions. (Author)

A74-28067 # **Biological effects of long-wavelength X radiation (Biologicheskoe deistvie dlinnovolnovogo Rentgenovskogo izluchennia).** A. N. Liberman. Moscow, Atomizdat, 1973. 156 p. 216 refs. In Russian.

Description of radiohygienical factors affecting working conditions and physiological effects influencing the health of personnel who come in contact with various equipment emitting soft X radiation (energy range from 10 to 50 KeV). Typical circumstances of exposure are delineated by explaining particular radiation sources, generally experienced dosages, and measures commonly employed to monitor exposure hazards and health status. Original experimental data and information published in the literature are used to illustrate short- and long-term effects on the organism and to characterize the biological effectiveness of this radiation with respect to numerous morphological, hematological, immunological, and biochemical indices. Problems of defining safety standards and hazard control methods are considered. T.M.

A74-28076 **The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972.** Symposium supported by the U.S. Navy; Contract No. N00019-72-C-0139. Edited by E. Schönbaum (Ciba-Geigy Canada, Ltd., Toronto, Canada) and P. Lomax (California, University, Los Angeles, Calif.). Basel, S. Karger AG, 1973. 594 p. $58.30.

Central and peripheral mechanisms of temperature regulation, blood electrolytes and exercise in relation to temperature regulation in man, and aspects of calcium metabolism and respiration in skeletal muscle are among the topics covered in papers concerned with the pharmacology of thermoregulation. Other topics covered include temperature regulation in high-pressure environments, interrelationship of central nervous system glucopenia and heat production in mice, and the activation of behavioral responses in the regulation of body temperature in vertebrates. M.V.E.

A74-28077 **Pharmacological aspects of thermoregulation.** E. Schönbaum (Ciba-Geigy Canada, Ltd., Toronto, Canada). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 1-6. 9 refs.

Brief review of the field of thermoregulation pharmacology covered by the symposium. This field is essentially circumscribed by the analytical aspects of the interactions between drugs and mechanisms of thermal homeostasis. Definitions are provided for all of the important concepts underlying this field, in order to facilitate the mutual understanding of those whose prime interest lies in the action of drugs in its broadest aspects and those other symposium participants who study primarily the control of the internal environment. M.V.E.

A74-28078 **Central and peripheral mechanisms in temperature regulation.** L. D. Carlson. In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 7-21. 39 refs.

In order to provide a frame of reference for the discussion of the pharmacology of thermoregulation, some of the major elements of the temperature regulating system are reviewed. The review covers, in particular, the neural net with its afferent and efferent pathways and acetylcholine transmitter, the peripheral and internal receptors, current hypotheses about the role of the hypothalamus in temperature regulation, the effector systems, and the neurohumoral net. It is shown that the temperature regulating system is composed of a series and parallel set of controlling elements which act with time constants of varying length and are complexly integrated with other regulatory systems. M.V.E.

A74-28079 **The anatomy of heat exchange.** J. N. Hayward (California, University, Los Angeles, Calif.). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 22-41. 33 refs. Grants No. PHS-NS-05638; No. PHS-NS-10129.

Two basic patterns of brain temperature regulation by the cerebral arterial blood in mammals are described: the 'internal carotid' and the 'carotid rete' types. The comparative anatomy of cranial vascular heat exchange in five mammals is discussed. In the rhesus monkey, Macaca mulatta, the temperature of a regional brain

site is found to depend upon the distance of the site from the subarachnoid space, the local heat produced at the site, and the removal of heat from the site by the local blood flow. In other mammals, different thermoregulatory adjustments are shown to operate. These analyses indicate wide species differences in the neural regulation of body temperature. M.V.E.

A74-28080 Biochemical basis and regulation of thermogenesis. G. Steiner (Toronto, University, Toronto, Canada). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 42-56. 61 refs. Research supported by the Medical Research Council of Canada.

Heat production and its regulation are considered, and it is shown that heat is produced whenever substrate is oxidized. During oxidation, 75% of a substrate's energy is converted to heat and 25% to ATP. The body may produce more heat by burning more substrate. It may also obtain more heat from a given amount of substrate by converting less of its energy to ATP. Many drugs can affect these processes and almost all result in increased and not in decreased thermogenesis. M.V.E.

A74-28081 Hormones in regulation of body temperature. E. A. Sellers and K. V. Flattery (Toronto, University, Toronto, Canada). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 57-71. 27 refs.

Hormones are shown to represent the component parts of an elaborate communication system which makes it possible for the body to maintain homeostasis. The system includes direct communication (with feedback controls) from a single cell to its environment, from cell to cell within tissues, from groups of cells to cells in other tissues, and also includes the nervous system which is able to rapidly integrate the visceral and somatic functions of the body as a whole. The role of particular molecules transmitting information (hormones) must be regarded as part of the communication system rather than as entities separate from it. Each component of the system is essential for maintenance of homeostasis, although the variety of functions performed, the specificity of functions, and the rate of responses produced vary within each category. M.V.E.

A74-28082 * Blood electrolytes and exercise in relation to temperature regulation in man. J. E. Greenleaf (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 72-84. 66 refs.

Current knowledge and theories about the relation of blood electrolytes and exercise to thermoregulation in man are reviewed. It is shown that the elevation of body temperature during physical exercise is a regulated process and is not due to a failure of the heat dissipating mechanisms. Core and skin temperatures do not provide sufficient information to account for the control of sweating during exercise. Evidence is presented that suggests an association between equilibrium levels of rectal temperature and the osmotic concentration of the blood with essentially no influence of variations in plasma volume. M.V.E.

A74-28083 Aspects of calcium metabolism and respiration in skeletal muscle. C. P. Bianchi (Pennsylvania, University, Philadelphia, Pa.). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 85-88. 11 refs.

A74-28084 Temperature regulation in high pressure environments. R. W. Brauer (North Carolina, University, Wilmington, N.C.). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 99-111. Contract No. N00014-69-C-0341.

Following a review of human underwater physiology in terms of a complete cycle of a diver's compression, bottom sojourn, and decompression, the factors involved in thermal comfort and temperature regulation in such high-pressure environments are examined. It is shown that, in high-pressure atmospheres, thermoregulatory effects tend to be dominated by the physical properties of the gaseous environment or, more precisely, by the physical interaction of the gaseous atmosphere at various pressures with temperature exchange in all its modes. Special attention is given to the implications of the high thermal conductivity of helium-oxygen atmospheres. M.V.E.

A74-28085 The activation of behavioral responses in the regulation of body temperature in vertebrates. H. T. Hammel, L. I. Crawsjaw, and H. P. Cabanac (California, University, La Jolla, Calif.). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 124-141. 32 refs. Grant No. PHS-1-RO1-GM-17222-02.

Review of the thermoregulatory behavior in ectotherms and endotherms under a wide range of experimental conditions. It is shown that probably all vertebrate groups can transduce temperature to neural impulses by receptors in the skin and by neurons in the brain stem, and also possibly in the spinal cord and elsewhere. M.V.E.

A74-28086 Exchange between the blood-brain and cerebrospinal fluid of substances which can induce or modify febrile responses. K. E. Cooper and W. L. Veale (Calgary, University, Calgary, Alberta, Canada). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 278-288. 37 refs.

A74-28087 The antipyretic action of pyrazolones, derivatives of phenacetin and other new substances. E. Lindner (Farbwerke Hoechst AG, Frankfurt am Main, West Germany). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 325-341. 36 refs.

Review of the effect of antipyretic drugs developed in recent years upon the body temperature of rabbits, rats and mice fevered by various means. Some of these drugs like indomethacin, flufenamic acid, mefenamic acid and derivatives are shown to be the most potent in terms of the dose needed for antipyresis. Normal temperature is depressed by these drugs only to a small extent. There is no evidence that these drugs act peripherally, and their action on the central thermoregulatory structures is believed to be centered on the receptors in the anterior hypothalamic and preoptic region. There is also the possibility that they exert some inhibiting effects on other regions of the hypothalamus. M.V.E.

A74-28088 Acclimation to cold and the effect of drugs. M. K. W. Cottle (Alberta, University, Edmonton, Canada). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 342-358. 81 refs. Research supported by the Alberta Heart Foundation and Medical Research Council of Canada.

Review of published studies on the mechanisms of acclimation to cold, investigated with the aid of drugs mainly in small mammals. It is shown that acclimation to cold involves the development of nonshivering thermogenesis (NST) which is associated with an increased release of noradrenalin (NA). Brown fat is an important site of NST, and its effectiveness appears to be related to particular locations. The occurrence of brown fat in the atrial region is an example for this. Increases in stored brown fat, higher NA levels and

NA turnover are also likely to be related to NST development during cold acclimation. There are also indications that brown fat forms an intermediate 'hormone' which in turn generates some of the changes associated with cold acclimation. M.V.E.

A74-28089 **Effects of drugs on hibernation.** B. W. Johansson (General Hospital, Malmo, Sweden). In: The pharmacology of thermoregulation; Proceedings of the Satellite Symposium, San Francisco, Calif., July 23-28, 1972. Basel, S. Karger AG, 1973, p. 364-381. 78 refs.

The literature on the physiology of hybernation and on the effects of drugs on hibernation is reviewed. Various drugs and tissue extracts inducing or preventing hibernation are discussed, along with agents interfering with the arousal from and entry into hibernation. The effects of drugs on hibernators and nonhibernators are compared. M.V.E.

A74-28163 **Effects of myocardial strains on coronary blood flow.** J. M. Downey, H. F. Downey, and E. S. Kirk (South Florida, University, Tampa, Fla.; Illinois, University, Urbana, Ill.). *Circulation Research*, vol. 34, Mar. 1974, p. 286-292. 15 refs. Research supported by the Heart Association of Palm Beach County; Grant No. PHS-HE-10788.

Coronary blood flow in hearts experiencing large wall strains but no luminal pressure was compared with coronary blood flow in hearts experiencing significant pressure development and greatly reduced wall strains. Three series of experiments were performed with mongrel dogs. It was found that the systole redistributes coronary flow only by forming vascular sluices in response to compressive stresses in the myocardium as opposed to deformation of the vasculature resulting directly from dimensional changes. G.R.

A74-28164 * **Role of central and peripheral adrenergic mechanisms in neurogenic hypertension produced by brainstem lesions in rat.** N. Doba and D. J. Reis (Cornell University, New York, N.Y.). *Circulation Research*, vol. 34, Mar. 1974, p. 293-301. 36 refs. Grants No. NIH-NS-04876; No. NGR-33-010-179.

A74-28204 # **Performance and control behavior of a human operator tracking continuous stochastic signals - Linear description and nonlinear model (Leistungsfähigkeit und Regelungsverhalten des Menschen bei der Nachführung kontinuierlicher stochastischer Signale - Lineare Beschreibung und nichtlineares Modell).** K. Etschberger. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1973. 178 p. 75 refs. In German.

The principles of a quasi-linear description of manual control are considered together with investigations regarding the optimal design of manual control systems. Control performance, information transfer, and human control characteristics in the case of stochastic-signal tracking are explored, taking into account the dependence of the parameters on the quantity of information received during a certain time. Questions of manual information processing during the tracking of stochastic signals are investigated, giving attention to the fine structure of manual adjustment signals and a model for the manual control of continuous stochastic signals. G.R.

A74-28373 **The effect of visual feedback on physiological muscle tremor.** J. A. Stephens (King's College, London, England) and A. Taylor (St. Thomas's Hospital Medical School, London, England). *Electroencephalography and Clinical Neurophysiology*, vol. 36, May 1974, p. 457-464. Research supported by the National Fund for Research into Crippling Diseases and Medical Research Council.

Tremor is examined in a well-defined and simple task, i.e., constant isometric contraction of the human first dorsal interosseous muscle of the hand. The effect of changes in gain of the visual display on the relationship between total amplitude of tremor and contraction strength are first studied, followed by search for effects on its spectral distribution. The spectra are computed digitally by methods which yield statistically well-defined estimates. Appropriate tests are employed for the significance of differences between them. F.R.L.

A74-28374 **Clinical studies of the evoked response to rapid random flash.** S. J. Fricker and J. J. Sanders, III (Massachusetts Eye and Ear Infirmary, Boston, Mass.). *Electroencephalography and Clinical Neurophysiology*, vol. 36, May 1974, p. 525-532. 18 refs. Grants No. NIH-EY-00292; No. PHS-FR-05485; No. NIH-EY-00885-01.

A method is described for the measurement of visual evoked responses (VERs) using aperiodic stimuli and a cross-correlation method of detection. The stimulus timing is based upon a random pulse sequence, so that in effect there are many frequencies present simultaneously. Compared with conventional averaging techniques this gives an increased number of stimuli per unit time, and a specified type of frequency filtering depending upon the characteristics of the reference waveform. The physiological implications of the measurements are different than in the case of conventional average VERs, as with this method the VER waveform is a measure of the response to a rapid (and variable) series of stimuli, for example with average and maximum stimulus rates of 25 and 50 Hz, respectively. With such parameters the majority of the interflash intervals are short compared with the usual VER duration, and the resultant random flash VER output waveform has different properties than the conventional VER. F.R.L.

A74-28375 **Variability of the human average evoked brain response to visual stimulation - A warning.** D. I. Tepas, V. L. Guiteras, and R. L. Klingaman (St. Louis University, St. Louis, Mo.). *Electroencephalography and Clinical Neurophysiology*, vol. 36, May 1974, p. 533-537. 17 refs. Grant No. NIH-MH-14020-03.

STAR ENTRIES

N74-19718*# Baylor Univ., Houston, Tex.
PERIODICITY OF HIGH-ORDER NEURAL FUNCTIONS Final Progress Report
Peter Kellaway, Robert P. Borda, James D. Frost, James R. G. Carrie, and Alfred C. Coats 31 Dec. 1973 33 p refs
(Grant NGR-44-003-054)
(NASA-CR-138005) Avail: NTIS HC $4.75 CSCL 06P

The results of recent studies on higher order, integrative processes in the central nervous system are reported. Attempts were made to determine whether these processes exhibit any ongoing rhythmicity which might manifest itself in alterations of attention and alertness. Experiments were also designed to determine if a periodicity approximating that of the REM could be detected in various parameters of brain electrical activity. Author

N74-19719*# Wisconsin Univ., Madison. Dept. of Medicine.
VENOUS RETURN CURVES OBTAINED FROM GRADED SERIES OF VALSALVA MANEUVERS Final Technical Report
S. Martin Mastenbrook, Jr. Jan. 1974 44 p refs
(Grant NGR-50-002-204)
(NASA-CR-137361; ECE-74-2) Avail: NTIS HC $5.25 CSCL 06C

The effects were studied of a graded series of valsalva-like maneuvers on the venous return, which was measured transcutaneously in the jugular vein of an anesthetized dog, with the animal serving as its own control. At each of five different levels of central venous pressure, the airway pressure which just stopped venous return during each series of maneuvers was determined. It was found that this end-point airway pressure is not a good estimator of the animal's resting central venous pressure prior to the simulated valsalva maneuver. It was further found that the measured change in right atrial pressure during a valsalva maneuver is less than the change in airway pressure during the same maneuver, instead of being equal, as had been expected. Relative venous return curves were constructed from the data obtained during the graded series of valsalva maneuvers. Author

N74-19720*# Missouri Univ., Columbia. Space Sciences Research Center.
APPLICATION OF NITROGEN METABOLISM IN AUTOTROPHIC BACTERIA TO CHEMOSYNTHETIC BIOREGENERATION IN SPACE MISSIONS, SUPPLEMENT
Robert L. Wixom 7 Mar. 1974 18 p refs
(Grant NGR-26-003-023)
(NASA-CR-138030; Rept-5814-2229) Avail: NTIS HC $4.00 CSCL 06M

The chemolithotroph, Hydrogenomonas eutropha, was considered as a life support, bioregenerative system. This project focuses on several metabolic functions that are related to the proposed nitrogen cycle between man and this microbe. Specifically this organism has the capability to utilize as the sole nitrogen source such urine components as urea and fifteen individual amino acids but not nine other amino acids. The effectiveness of utilization was high for many amino acids. Several specific growth inhibitions were also observed. The enzyme that catalyzes the incorporation of ammonia in the medium into amino acids was identified as a NADP-specific, L-glutamate dehydrogenase. This enzyme has a constitutive nature. This organism can synthesize all of its amino acids from carbon dioxide and ammonia. Therefore with the background literature of multiple pathways of individual amino acid biosyntheses, our evidence to date is consistent with the Hydrogeneomonas group having the same pathway of valine-isoleucine formation as the classical E. coli. Author

N74-19721*# Techtran Corp., Glen Burnie, Md.
ACUTE BLOOD LOSS
V. B. Koziner Washington NASA Mar. 1974 33 p refs Transl. into ENGLISH of the book "Patologicheskaya Fiziologiya Ekstremal' nykh Sostoyaniy" Moscow, Meditsian Press, 1973 p 160-179
(Contract NASw-2485)
(NASA-TT-F-15369) Avail: NTIS HC $4.75 CSCL 06E

The physiology and treatment of various types of blood loss is described. Various stages of blood loss are characterized by severity. The efficacy of blood replacing substances and plasmas is discussed. Experiments on animals to determine the effective blood loss and the tolerance of the organism to blood loss are described. The current state of blood transfusion practices is evaluated. Author

N74-19722*# Linguistic Systems, Inc., Cambridge, Mass.
EXPERIMENTAL RESTRAINT ULCER IN THE WHITE RAT. 1: METHODS, INCIDENCE OF LESIONS, AND MODIFICATIONS BY CERTAIN TECHNICAL AND PHARMACODYNAMIC TECHNIQUES
S. Bonfils, G. Rossi, G. Liefooghe, and A. Lambling Washington NASA Mar. 1974 13 p refs Transl. into ENGLISH from Rev. Franc. Etudes Clin. Biol. (Paris), v. 4, 1959 p 146-150
(Contract NASw-2482)
(NASA-TT-F-15381) Avail: NTIS HC $4.00 CSCL 06C

The experimental method, which is relatively simple and does not involve surgery or pharmodynamic techniques, is described. Female white rats weighing 150 to 190 g were used in the study. Author

N74-19723*# Scientific Translation Service, Santa Barbara, Calif.
THE CONTENT OF ASCORBIC ACID IN THE ADRENAL GLANDS AND THE PRODUCTION OF CORTICOSTEROIDS IN VITRO IN IRRADIATED, IMMOBILIZED, AND HYPOPHYSECTOMIZED RATS
E. R. Bagramyan Washington NASA Mar. 1974 15 p refs Transl. into ENGLISH from Probl. Endokrinol. i Gormonoterap. (Moscow), v. 12, Sep. - Oct. 1966 p 66-72
(Contract NASw-2483)
(NASA-TT-F-15383) Avail: NTIS HC $4.00 CSCL 06C

In rats immobilized for a period of one hour the content and concentration of ascorbic acid in the adrenal glands fell, whereas corticosteroid production intensified. There was a rise of biosynthetic capacity of the adrenal tissue. No change occurred in the weight of the adrenal glands under the effect of immobilization. In hypophysectomized rats, 2 weeks after the operation a marked reduction of the adrenal gland weight and ascorbic acid content in them was noted. Ascorbic acid content rose, and corticosteroid production exhibited a drop in experiments in vitro. At the height of radiation sickness in irradiated rats there was a rise of the adrenal gland weight and an increase of ascorbic acid contents in them. Ascorbic acid content failed to change, and corticosteroid production increased in vitro. These changes did not develop in hypophysectomized animals. Author

N74-19724*# Scientific Translation Service, Santa Barbara, Calif.
RADIATION HAZARD IN SPACE
L. I. Miroshnichenko Washington NASA Apr. 1974 22 p refs Transl. into ENGLISH from Priroda (Moscow), no. 10, Oct. 1973 p 10-16
(Contract NASw-2483)
(NASA-TT-F-15400) Avail: NTIS HC $4.25 CSCL 06R

Radiation hazard in space travel as it has been estimated based on the data of Soviet and American spaceflights and terrestrial experiments is discussed. Calculations, charts and graphs are provided to clarify the text. Many data are drawn from the Apollo projects. Author

N74-19725*# Scientific Translation Service, Santa Barbara, Calif.
MORPHOMETRIC, PHYSIOLOGICAL, HISTOLOGICAL, AND BIOCHEMICAL CHANGES IN RAT FOOT EXTENSORS IMMOBOLIZED BY PLASTER
C.-P. Simard Washington NASA Mar. 1974 35 p refs Transl. into ENGLISH from La Vie Medicale au Can. Franc. (Canada), v. 2, Apr. 1973 p 325-340
(Contract NASw-2483)
(NASA-TT-F-15423) Avail: NTIS HC $4.75 CSCL 06S

The development of muscular and osseous atrophy of the immobilized foot of a rat is studied. The morphometric, physiological, and biochemical parameters of the extensors, immobolized in plaster, are investigated. The statistical analysis of the results shows significant differences with respect to the three parameters studied. Author

N74-19726*# Hardin-Simmons Univ., Abilene, Tex. Dept. of Biology.
A STUDY OF PSYCHROPHILIC ORGANISMS ISOLATED FROM THE MANUFACTURE AND ASSEMBLY AREAS OF SPACECRAFT TO BE USED IN THE VIKING MISSION Planetary Quarantine Activities Report, 1 Jul. - 31 Dec. 1973
Terry L. Foster and Luther Winans, Jr. Feb. 1974 41 p Presented at the Semiannual NASA Spacecraft Sterilization Technol. Seminar, San Francisco, 20-21 Feb. 1974
(Grant NGR-44-095-001)
(NASA-CR-137346; Rept-3) Avail: NTIS HC $5.25 CSCL 06M

The ability of psychrophilic microorganisms to grow in some of the environmental conditions suggested for Mars is studied with particular attention given to the effects of moisture and nutrients on growth. Results of growth with the slide culture technique are presented and indicate that this technique can be a rapid and sensitive technique for demonstration of microbial growth under various environmental conditions. Additional soil samples have been obtained from Cape Kennedy, and results of these assays at various low temperatures for psychrophilic populations are presented. The heat resistance of some of the psychrophilic sporeformers have been determined. Psychrophilic organisms were isolated from the teflon ribbons at Cape Kennedy and characterization of these was begun. In addition, heat survivors from the teflon ribbons are being investigated, and partial characterizations of these are presented. Author

N74-19727*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PLANETARY QUARANTINE: SPACE RESEARCH AND TECHNOLOGY Semiannual Review, 1 Jul. - 31 Dec. 1973
Apr. 1974 132 p refs
(Contract NAS7-100)
(NASA-CR-137345; JPL-900-655) Avail: NTIS HC $9.75 CSCL 06M

The impact of satisfying satellite quarantine constraints on current outer planet mission and spacecraft designs is considered. Tools required to perform trajectory and navigation analyses for determining satellite impact probabilities are developed. Author

N74-19728*# Techtran Corp., Glen Burnie, Md.
CLINICAL AND EXPERIMENTAL INVESTIGATIONS WITH SERNYL AND COMBELEN FOR IMMOBILIZATION OF RUMINANTS
S. Jancke and A. Kuntze Washington NASA Mar. 1974 10 p refs Transl. into ENGLISH from Arch. Exp. Veterinaermed. (Leipzig), v. 25, 1971 p 847-852
(Contract NASw-2485)
(NASA-TT-F-15422) Avail: NTIS HC $4.00 CSCL 06E

By using a combination of Sernyl (phencyclidine) and Combelen (propionylpromazine), 86 ruminants belonging to 23 species and subspecies were immobilized. Sixty-two of the animals were in Berlin Zoo and the remainder in various game reserves. The onset of immobilization after injection of 0.5-4.0 Sernyl and 0.01-0.13 ml Combelen solution per kg body weight varied in different species from 5 to 100 minutes (average 7-12) after injection and it lasted for 10-240 minutes. Fallow deer required a much higher dosage than the other Cervidae. As a rule, high dosage produced longer and deeper anesthesia. Experiments on five domestic sheep and four goats showed that 5 or 6 times the normal dosage was well tolerated. A toxic effect was not seen until ten times the normal dosage (10 mg Sernyl + 0.1 ml Combelen solution) was given - 3 of 7 animals died. Two of those that died developed hyperthermia (41 C). Author

N74-19729*# California Univ., Los Angeles. Dept. of Biology.
AN ANALYSIS OF THE CIRCUITRY OF THE VISUAL PATHWAY OF THE LATERAL EYE OF LIMULLUS Final Progress Report, 1 Apr. 1969 - 31 Mar. 1970
Fritiof S. Sjoestrand 31 Mar. 1970 12 p
(Grant NGR-05-007-205)
(NASA-CR-132941) Avail: NTIS HC $4.00 CSCL 06P

The methodology is discussed for three-dimensional analysis of the nervous system on the basis of electron micrographs of serial sections. An analysis is presented of a part of the circuitry of the rabbit retina. In addition, some exploratory work is reported with respect to the visual cortex of the cat brain. A proper technique for preservation of the visual cortex was worked out and a technique to localize microelectrode tips in the tissue in connection with electron microscopy was partially worked out. Author

N74-19730# Joint Publications Research Service, Arlington, Va.
SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 8, NO. 1, 1974
15 Apr. 1974 141 p refs Transl. into ENGLISH of Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 (JPRS-61487) Avail: NTIS HC $10.25

The problems of acceleration tolerance, weightlessness simulation, circadian rhythm disturbances, and hypokinesia in manned space flight are considered.

N74-19731 Joint Publications Research Service, Arlington, Va.
EFFECT OF TRANSMERIDIONAL FLIGHTS ON THE HUMAN BODY
S. I. Stepanova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 1-14 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 3-12

The pertinent literature is reviewed. The functions which have exhibited desynchronosis after transmeridional flights are described. The relationship between the time of synchronization of circadian rhythms in the body and local time and the level of the time change, individual factors, geographical direction of the flight (to the west or east) and the outgoing and return flight is discussed. Recommendations on how to reduce the negative effect of transmeridional flights on flight personnel, athletes and businessmen are presented. Author

N74-19732 Joint Publications Research Service, Arlington, Va.
PROBLEMS IN SPACE RADIOBIOLOGY AND RADIATION SAFETY OF SPACE FLIGHTS
C. A. Tobias and Yu. G. Grigoryev *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 15-26 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan-Feb. 1974 p 12-21

Main criteria for evaluating radiation hazards of different space flights and qualitative characteristics of these criteria are presented. The results of radiobiological investigations in space are given and approaches to determination of the admissible levels of exposure cosmonauts to irradiation are described. The objectives of advanced research are considered. Author

N74-19733 Joint Publications Research Service, Arlington, Va.
STATISTICAL DYNAMICS OF OXYGEN CONSUMPTION BY MAN DURING MODERATE PHYSICAL WORK
V. K. Vasilyev *In its* Space Biol. and Aerospace Med., Vol. 8 No. 1974 (JPRS-61487) 15 Apr. 1974 p 27-34 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow) v. 8, no. 1, Jan.-Feb. 1974 p 27-34

Transient processes of oxygen consumption by man performing moderate physical exercises (about 600 kgm/min) are described mathematically by second degree differential equations the right hand of which are a function of the load. Mathematical expectations and correlation functions for impulse transient functions are given. Formulas are derived for the first two statistical moments for perturbation to the oxygen partial pressure control circuit in a sealed chamber. The data obtained are used in analyzing and selecting the performance of the oxygen partial pressure control circuit in a life support system. Author

N74-19734 Joint Publications Research Service, Arlington, Va.
USE OF BIOMECHANICS IN INVESTIGATION OF THE HUMAN CARDIOVASCULAR SYSTEM DURING PROLONGED SPACEFLIGHT
V. M. Zaiko and V. G. Aleksandrov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 35-40 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 27-31

Biomechanical methods can be used in studying the cardiovascular function of cosmonauts exposed to prolonged spaceflight. An adequate mathematical model of a pulsating blood flow in the arteries has been formulated, using the biophysical mechanism of myogenic autoregulation associated evolutionarily with gravity, to calculate cardiovascular parameters on the basis of hemodynamic characteristics measured indirectly in spaceflight. The model also makes it possible to select physiologically sound criteria for determining the duration of a prolonged spaceflight. Author

N74-19735 Joint Publications Research Service, Arlington, Va.
EFFECT OF ELECTRIC STIMULATION OF THE MEDULLA OBLONGATA ON THE ELECTROCARDIOGRAM AND SOME INDICES OF BLOOD CIRCULATION AND RESPIRATION
B. B. Yegorov and S. A. Skuratova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 41-48 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 31-36

Chronic and acute experiments were carried out on rabbits. The effect of electric stimulation of the medulla oblongata on arterial pressure, the EKG, respiration and the EEG of the cortex and subcortical structure of the brain was investigated. In most cases stimulation of the medulla oblongata was accompanied by an increase in partial pressure, a decrease in the pulse rate and an increase in respiration rate. It also induced synchronization in the cortex and regulation of the rhythm in subcortical formations. No significant correlation was found between EEG changes and autonomic parameters. Author

N74-19736 Joint Publications Research Service, Arlington, Va.
EFFECT OF ADEQUATE STIMULATION OF THE VESTIBULAR APPARATUS ON IMPULSE ACTIVITY OF SPINAL INTERNEURONS
G. S. Ayzikov and A. V. Mokrousova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 49-56 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 36-41

The spontaneous impulse activity of plates 7-9 of the lumbosacral part of the spinal cord during adequate stimulation of the otoliths was studied. The following four types of response were discriminated: increase and decrease in impulse activity, appearance of salvo activity at definite moments in movement of the stand with the animals and the absence of changes in rhythm of the neurons. It was noted that the period of stimulation of the otoliths was accompanied by phasic changes in the rhythm of interneurons which disappeared with cessation of swinging. The noted changes - quickening or thinning of impulse activity - can persist for a long time during the period of the aftereffect of vestibular stimulation. Author

N74-19737 Joint Publications Research Service, Arlington, Va.
EXTRASECRETORY FUNCTION OF THE LIVER AND ENZYME SECRETORY FUNCTION OF THE PANCREAS IN RATS AFTER EXPOSURE TO ACCELERATIONS
K. V. Smirnov, I. L. Medkova, and L. G. Goland *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 57-62 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 41-45

The extrasecretory function of the liver and the enzyme secretory function of the pancreas in rats were studied during the immediate aftereffect period of exposure to transverse accelerations of 10 g for 20 minutes. The biochemical analysis of the main components of bile and the activity of pancreatic enzymes in the pancreas and blood exhibited an increase in the lipid concentration, activation of lipolytic enzymes and inhibition of the activity of amylase and trypsin. These changes were exhibited three hours after the exposure. At later periods (up to six days) the mentioned parameters exhibited a phasic pattern. The changes in the secretory functions of the liver and pancreas seem to be associated with hemodynamic disturbances. Author

N74-19738 Joint Publications Research Service, Arlington, Va.
EFFECT OF ACCELERATIONS ON THE ACTIVITY OF ASPARTATE AMINOTRANSFERASE OF THE EXTERNAL AND INTERNAL MEMBRANES OF MITOCHONDRIA
I. D. Yertanov and L. A. Rubashkina *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 63-66 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 45-47

Exposure of rats to transverse accelerations of 36 g for six minutes decreased the specific activity of aspartate aminotransferase of the outer and inner membranes of mitochondria. It is concluded that the decrease was not associated with the intramitochondrial movement of enzyme molecules. This may be brought about by an inactivation of the enzyme by the specific inhibitor or by conformational changes in the structure which followed the formation of the enzyme membrane complex. Author

N74-19740 Joint Publications Research Service, Arlington, Va.
PSYCHOPHYSIOLOGICAL CHANGES IN AN AIRMAN'S ACTIVITY UNDER THE INFLUENCE OF ALCOHOL
B. M. Pikovskiy *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 75-79 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan-Feb. 1974 p 53-56

Alcohol induced changes in the human body exert a negative effect on man's activity and therefore should be regarded as generalized noise in functioning of the man machine system. Disturbances in human activity may occur both in the perception and evaluation of information and in the motor responses. Insignificant doses of alcohol taken before flight or its aftereffect contribute to in-flight emergency situations. Safety measures should include up-to-date methods for the diagnosis of alcohol intoxication and widespread propaganda indicating that the day before the flight and on the day of the flight aircraft personnel must not drink. Author

N74-19741 Joint Publications Research Service, Arlington, Va.
USE OF DIFFERENT METHODS FOR STUDYING SMALL GROUPS APPLICABLE TO GROUP SCREENING PROBLEMS c05
N. A. Gosudarev *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 80-87 refs Transl. into ENGLISH from Kosmich. biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 80-87

The possibility of prolonged group space flights makes the optimum selection of space crews very important. A series of methods for evaluating the psychological compatibility of crew members has been developed on the basis of theoretical and methodological findings in a group selection system. These methods were used in studying the personality relationships among members of isolated groups which were exposed to conditions similar to spaceflight as well as personality responses as a function of the position occupied by an individual in the group. The use of the methods is illustrated by examinations of skiers who traversed an arctic region in Long Strait. Author

N74-19742 Joint Publications Research Service, Arlington, Va.
FUNCTIONAL TEST WITH DECOMPRESSION OF THE LOWER BODY IN THIRTY-DAY ANTIORTHOSTATIC HYPOKINESIA
V. A. Degtyarev, A. D. Voskresenskiy, N. D. Kalmykova, and Z. A. Kirillova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 88-92 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan-Feb. 1974 p 61-65

Nine test subjects underwent functional tests with LBNP applied at -35 and -45 mm Hg for ten minutes during a 30-day hypokinetic experiment. Subjectively they tolerated the tests well. Cardiovascular responses were similar to orthostatic responses but less pronounced. During hypokinesia the response to the tests increased. A statistical analysis of the relationship between the heart rate and integral evaluations revealed a correlation between responses to LBNP of -45 mm Hg and the orthostatic load ($r = 0.71$). This indicates the possibility of predicting orthostatic reactions on the basis of LBNP tests. Author

N74-19743 Joint Publications Research Service, Arlington, Va.
INFLUENCE OF THIRTY-DAY HYPOKINESIA IN COMBINATION WITH EXPOSURE TO LBNP ON TOLERANCE TO ACCELERATIONS (PLUS Gz)
P. M. Suvorov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 93-97 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 65-68

The effect of hypokinesia combined with LBNP on human tolerance to accelerations are studied. Before and after hypokinesia the subjects were centrifuged at 3 g for 30 sec and at 5 g as long as it could be tolerated. Two days after exposure to hypokinesia and LBNP the duration of tolerance to accelerations of 5 g was 24.2-36.5% of the initial level. This may be brought about by the functional activity of the muscular system and venous tone which results in a marked decrease in systolic volume and cardiac output during exposure to accelerations and accordingly in the early development of optic disturbances.
Author

N74-19744 Joint Publications Research Service, Arlington, Va.
ROENTGENOLOGICAL STUDY OF CARDIAC FUNCTION AND MINERAL SATURATION OF BONE TISSUE AFTER THIRTY-DAY HYPOKINESIA
I. G. Krasnykh *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 98-103 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 68-71

Before and on the fourth day of a 30-day bed rest experiment the cardiac size and output, as well as the contractile function of the myocardium were measured using teleroentgenokymograms. Bone density of the right heel bone and the first phalanx of the fifth finger on the right hand was determined roentgenophotometrically. In the early recovery period the cardiac size, cardiac output and the force of cardiac contractions decreased whereas the heart rate increased. Bone density also decreased. The countermeasures applied - physical exercises, lower body negative pressure and muscle electrostimulation - reduced the mentioned changes but did not eliminate them entirely. Author

N74-19745 Joint Publications Research Service, Arlington, Va.
EFFECT OF 30-DAY HYPOKINESIA IN COMBINATION WITH LBNP TRAINING ON SOME INDICES OF THE FUNCTIONAL STATE OF THE CARDIOVASCULAR SYSTEM AT REST
A. N. Aleksandrov and A. K. Kochetov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 104-105 Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 71-72

The effect of 30-day bed rest and LBNP training on the functional state of the cardiovascular system at rest was studied in two groups of test subjects. A moderate decline in tone and a delay in blood rate flow were noted in the leg vessels (mainly venules). The systolic blood volume decreased. The cardiac output at first decreased and then gradually increased, reaching the initial level by the 30th day, due to an increase in the heart rate. The changes in the EKG T wave suggested metabolic changes in the myocardium. These changes in the EKG were more distinct in test subjects who were daily subjected to LBNP training. Author

N74-19746 Joint Publications Research Service, Arlington, Va.
REACTIONS OF THE CARDIOVASCULAR SYSTEM DURING 30-DAY SIMULATION OF WEIGHTLESSNESS BY MEANS OF ANTIORTHOSTATIC HYPOKINESIA
V. V. Beregovkin and V. V. Kalinichenko *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 106-112 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 72-77

Cardiovascular reactions of nine test subjects were investigated during 30-day bed rest with their heads tilted down 4 deg from the horizontal. Before and after the bed rest experiment the test subjects performed five minute vertical standing tests. During bed rest tests the subjects exhibited moderate changes in the functional state of the cardiovascular system. The use of preventive measures - physical exercises, lower body negative pressure and muscle electrostimulation - had a favorable effect on cardiovascular conditioning. This was suggested by a faster recovery of the functional state of the cardiovascular system after completion of the experiment. Author

N74-19747 Joint Publications Research Service, Arlington, Va.
DYNAMICS OF SOME INDICES OF THE CARDIAC FUNCTION AND ITS CORRELATIONS WITH SYSTEMIC CIRCULATION DURING THE DAY IN MAN
I. Ye. Oranskiy, V. V. Skryabin, V. S. Sakovich, and A. Ye. Myakota *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 113-118 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 77-80

Examinations of 60 persons revealed a certain circadian periodicity of their cardiac function which was dependent in general on their mental and physical activity. The correlations of conjugated parameters of cardiodynamics and hemodynamics were varied and associated with many factors that often were not taken into account. Author

N74-19748 Joint Publications Research Service, Arlington, Va.
FISTULA TUBE AND REGIME OF FORCED FEEDING OF EXPERIMENTAL ANIMALS
N. T. Svistunov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 119-124 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 80-84

The design of a stomach fistula tube is reported that contains flexible flange in its sleeve to be applied by sutures to the inner side of the abdominal well. The method for its implantation is presented and a regime for feeding the experimental animals is selected. G.G.

N74-19749 Joint Publications Research Service, Arlington, Va.
MAN'S TOLERANCE TO CHEST-BACK TRANSVERSE ACCELERATIONS
Ye. B. Shulzhenko, I. F. Vil-Vilyams, T. N. Krupina, V. I. Pervushin, and M. P. Aleksandrova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 125-127 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 84-85

Physiological reactions, characterizing man's tolerance of transverse accelerations, are studied by observing cardiovascular and muscle reactions to centrifuging stress. Results of the experiments reveal that the duration of exposure varies broadly; phase shifts in bioelectric activity of the myocardium and muscles are observed criteria. Functional changes in the central nervous system of some subjects persist for five to six days and have the characteristics of circulatory impairment. G.G.

N74-19750 Joint Publications Research Service, Arlington, Va.
MODULATING INFLUENCE OF THE OTOLITHS ON REFLEXES OF THE SEMICIRCULAR CANALS
A. A. Lakoza and A. A. Shipov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 128-131 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 85-87

The influence of otolithic formations on the reflexes from the semicircular canals was studied using models of a unilateral labyrinthectomy. Change in the frequency of fallout nystagmus in the case of tilts of the animal in different directions was observed. Author

N74-19751 Joint Publications Research Service, Arlington, Va.
THRESHOLD VALUES OF CORIOLIS ACCELERATION DURING MAN'S ROTATION WITH HEAD MOVEMENTS IN THE SAGITTAL AND FRONTAL PLANES
F. A. Solodovnik *In its* Space Biol. and Aerospace Med., Vol. 8, No. 1, 1974 (JPRS-61487) 15 Apr. 1974 p 132-135 refs Transl. into ENGLISH from Kosmich. Biol. Aviakosmich. Med. (Moscow), v. 8, no. 1, Jan.-Feb. 1974 p 87-89

The threshold values were determined for Coriolis accelerations acting on the vestibular apparatus during man's rotation with movement of the head in the sagittal and frontal planes. Author

N74-19752*# Techtran Corp., Glen Burnie, Md.
INFLUENCE OF PROLONGED HYPODYNAMIA ON CERTAIN PHYSIOLOGICAL FUNCTIONS IN DOGS
B. R. Yaremenko Washington NASA Apr. 1974 8 p refs Transl. into ENGLISH from Patol. Fiziol. i Eksperim. Terapiya (Moscow), v. 14, 1970 p 10-13
(Contract NASw-2485)
(NASA-TT-F-15420) Avail: NTIS HC $4.00 CSCL 06S

In experiments on 20 dogs, lasting 14-28 days, the general behavior of the animals and the modification of a number of parameters were studied with restriction of the motor activity of the animals in special stands. The animals were divided into two groups on the basis of their reactions to hypodynamia: those with active behavior, and those with progressive general inhibition and early development of muscular weakness. During the first two weeks, all of the animals showed a gradual increase in arterial pressure, which remained elevated subsequently; the level of the pressor sinocarotid reflects decreased, and the body weight fell. Pulse rate and body temperature did not change appreciably. Author

N74-19753# Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario). Biosciences Div.
THE ROLE OF DIETARY FAT IN ENHANCING COLD TOLERANCE: A REVIEW OF THE LITERATURE
M. J. Baigent Jul. 1973 11 p refs
(DCIEM-73-R-951) Avail: NTIS HC $4.00

The evidence in favor of an enhanced cold tolerance due to increased dietary fat during chronic exposure to cold is not convincing for either experimental animals or for human subjects. Cold tolerance during exposure to more acute condition does seem to improve as a consequence of higher fat levels. This improvement, however, appears to be facilitated by, if not dependent upon, such ancillary factors as a period of pre-adaptation to the experimental diet prior to cold exposure, or frequent feedings during exposure. The value of preconditioning an animal or individual to specific timing or frequency of meals prior to cold exposure has not been explored to any degree but appears to merit serious consideration. Author

N74-19754*# Minnesota Univ., Minneapolis. Div. of Environmental Health.
ENVIRONMENTAL MICROBIOLOGY AS RELATED TO PLANETARY QUARANTINE Semiannual Progress Report
Irving J. Pflug Dec. 1972 108 p refs
(Grant NGL-24-005-160)
(NASA-CR-138002; SAPR-9) Avail: NTIS HC $8.50 CSCL 06M

The experimental design of a study to evaluate the effect of different cleaning methods and storage conditions on the dry heat resistance of Bacillus subtilis var. niger spores is described and the results for the first evaluation are reported. Specifically, the synergistic effect which occurs when spores are subjected simultaneously to dry heat and gamma radiation so as to be able to specify thermoradiation sterilization cycles was investigated. Attempts were made to understand the underlying mechanism(s) that lead to spore death from this combination of stresses. Data cover: (1) the survival of spores on surfaces at various temperatures in a precisely controlled environmental system, (2) the rate of destruction of these spores at ambient temperature when subjected to gamma radiation, and (3) the rate of destruction of spores when they are subjected to combined gamma radiation and thermal stresses. Author

N74-19755*# Exotech Systems, Inc., Falls Church, Va.
SCIENTIFIC AND TECHNICAL SERVICES DIRECTED TOWARD THE DEVELOPMENT OF PLANETARY QUARANTINE MEASURES FOR AUTOMATED SPACECRAFT Final Report
31 Mar. 1974 76 p
(Contract NASw-2503)
(NASA-CR-138001) Avail: NTIS HC $7.00 CSCL 06M

The work is reported, which was performed in the specific tasks of the Planetary Quarantine research program for developing parameter specifications of unmanned scientific missions to the planets. The effort was directed principally toward the advancement of the quarantine technology, applicable to all future missions to planets of biological interest. The emphasis of the research was on coordinated evaluation, analysis, documentation, and presentation of PQ requirements for flight projects such as Viking and Pioneer. F.O.S.

N74-19756# Florida Univ., Gainesville. Dept. of Entomology and Nematology.
DETERMINATION OF OPTIMUM SYSTEM AND AIRCRAFT FOR AERIAL DISPERSAL OF INSECTICIDES FOR CONTROL OF INSECTS OF MEDICAL IMPORTANCE Final Report, 1 Aug. 1972 - 31 Jul. 1973
Claude T. Adams, Sr. and William G. Eden 31 Jul. 1973 60 p refs
(Contract DADA17-72-C-2180)
(AD-772002) Avail: NTIS CSCL 06/6

Investigations reported are the results of an extensive survey to determine the most desirable systems characteristics for use in the aerial application of insecticides. A study of the droplet size formation is presented, and appears to be the most critical single factor from an economic and operational standpoint. The impact of varied micrometeorological phenomena is discussed. Formation of the droplet and the development of the droplet spectrum however present the greatest problems. Information on droplet formation through the use of rotary nozzles is reviewed and compared to droplet production by the hydraulic nozzle. A critical review of currently available equipment, both in-service and by contract is presented and the salient features of each are discussed. A review of in-service aircraft, potentially

useful in this operation, is presented. Critical features of each type of aircraft are discussed, and the field of choice is narrowed to a single aircraft. A review of currently available insecticides for aerial dispersal is presented with unit cost/acre data. (Modified author abstract) GRA

N74-19757# Naval Medical Research Inst., Bethesda, Md.
BIBLIOGRAPHY OF REPORTED BIOLOGICAL PHENOMENA ('EFFECTS') AND CLINICAL MANIFESTATIONS ATTRIBUTED TO MICROWAVE AND RADIO-FREQUENCY RADIATION, SUPPLEMENT NO. 4 Medical Research Interim Report
Zorach R. Glaser Jun. 1973 24 p refs
(MF12524015)
(AD-770621) Avail: NTIS CSCL 06/18

More than 325 additional references on the biological responses to radio frequency and microwave radiation, published up to May 1973, are included in this bibliography of the world literature. Particular attention has been paid to the effects of non-ionizing radiation on man at these frequencies. The citations are arranged alphabetically by author, and contain as much information as possible so as to assure effective retrieval of the original documents. Soviet and East European literature is included in detail. (Modified author abstract) GRA

N74-19758+ Advisory Group for Aerospace Research and Development, Paris (France).
BIBLIOGRAPHY OF PAPERS AND REPORTS RELATED TO THE GUST UPSET/PILOT DISORIENTATION PROBLEMS
Clifford F. Newbarry, comp. (Boeing Co., Wichita, Kans.) Feb. 1974 20 p refs
(AGARD-R-616) Avail: NTIS HC $4.00

A compilation of papers and reports relating to the problem of an airplane being upset for atmospheric disturbances and the pilot being disorientated as a result of the upset is presented. Papers are listed by title and report number and, a summary is also provided where available. Author

N74-19759 Michigan Univ., Ann Arbor.
THE MANUAL CONTROL OF VEHICLES UNDERGOING SLOW TRANSITIONS IN DYNAMIC CHARACTERISTICS Ph.D. Thesis
Thomas Edward Moriarty 1973 141 p
Avail: Univ. Microfilms Order No. 74-3700

The manual control of a vehicle with slowly time-varying dynamics is discussed along with the development of analytic techniques and computer implementation necessary for the study of time-varying systems. This research deals with the human operator as he controls a time-varying plant in which the changes are neither abrupt nor so slow that the time variations are unimportant. An experiment in which human pilots controlled the longitudinal model of a simulated time-varying aircraft is described. The vehicle changed from a pure double integrator to a damped second order system, either instantaneously or smoothly over time intervals of 30, 75, or 120 seconds. It is shown that the pilot's performance in the time-varying task is essentially equivalent to his performance in stationary tasks which correspond to various points in the transition. Dissert. Abstr.

N74-19760*# Scientific Translation Service, Santa Barbara, Calif.
CROSS-ACCLIMATIZATION BETWEEN BODY TRAINING AND ALTITUDE TOLERANCE
E. D. Voight Washington NASA Apr. 1974 10 p refs Transl. into ENGLISH from Beitr. Weltraumbiol. Biophys., DVLR report DLR-FB-68-24 (Bad Godesberg), Apr. 1968 p 49-56 Presented at Meeting of Extraterrestrial Biophys. and Biol., Frankfurt au Main, 26-27 Oct. 1966
(Contract NASw-2483)
(NASA-TT-F-15434; DLR-FB-69-24) Avail: NTIS HC $4.00 CSCL 05E

Cross acclimatization between physical training and oxygen deficiency is indicated by measurements of adrenal corticosteroid levels in rowers in and out of training. Cross acclimatization is also indicated in nonathletes before, during, and after exposure in an altitude chamber at a pressure equivalent to 6,900 m. Blood ATP measurements agree. Author

N74-19761*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
VISUAL EXAMINATION APPARATUS Patent Application
Richard F. Haines, James W. Fitzgerald, and Salvadore A. Rositano, inventors (to NASA) Filed 19 Mar. 1974 21 p
(NASA-Case-ARC-10329-2; US-Patent-Appl-SN-452768) Avail: NTIS HC $4.25 CSCL 06B

Visual examination apparatus and, more particularly, an automated visual sensitivity tester for examining the eyes of a human being to determine visual field sensitivity and blind spot size, shape, and position is described. A projection system is provided for projecting dynamic visual stimuli onto a viewing screen which is viewed by a patient through an infinity collimating lens. The projection system also includes several photocells for developing electrical signals commensurate with the projected visual stimuli. Response signals provided by a hand held switch and the electrical signals from photocells are fed into a signal conditioner and then into a control unit which drives an X-Y recorder to provide a record of both stimulus and response signals. NASA

N74-19762*# Scientific Translation Service, Santa Barbara, Calif.
CATALYSIS AND LIFE-SUPPORT SYSTEMS IN OUTER SPACE
O. V. Krylov, V. A. Naumov, and Yu. Ye. Sinyak Washington NASA Apr. 1974 23 p refs Transl. into ENGLISH from Priroda (Moscow), no. 10, Oct. 1973 p 2-9
(Contract NASw-2483)
(NASA-TT-F-15399) Avail: NTIS HC $4.25 CSCL 06K

Several methods of using catalysts in spacecraft life support systems are discussed. Special emphasis is placed on methods (catalytic) of utilizing waste products for crew life support functions. Formulas and charts are provided which show the rough dimensions and operating principles of such catalytically functioning systems. Author

N74-19763*# Life Systems, Inc., Cleveland, Ohio.
DEVELOPMENT OF AN IODINE GENERATOR FOR RECLAIMED WATER PURIFICATION IN MANNED SPACECRAFT APPLICATIONS Final Report, 26 Jun. 1972 - 28 Aug. 1973
R. A. Wynveen, J. D. Powell, and F. H. Schubert Aug. 1973 122 p refs
(Contract NAS1-11765)
(NASA-CR-134219; ER-171-3-2) Avail: NTIS HC $9.25 CSCL 06I

A successful 30-day test is described of a prototype Iodine Generating and Dispensing System (IGDS). The IGDS was sized to iodinate the drinking water nominally consumed by six men, 4.5 to 13.6 kg (10 to 30 lb) water per man-day with a + or - 10 to 20% variation with iodine (I2) levels of 0.5 to 20 parts per million (ppm). The I2 treats reclaimed water to prevent or eliminate microorganism contamination. Treatment is maintained with a residual of I2 within the manned spacecraft water supply. A simplified version of the chlorogen water disinfection concept, developed by life systems for on-site generation of chlorine (Cl2), was used as a basis for IGDS development. Potable water contaminated with abundant E. Coliform Group organisms was treated by electrolytically generated I2 at levels of 5 to 10 ppm. In all instances, the E. coli were eliminated. Author

N74-19764# Air Force Human Resources Lab., Wright-Patterson AFB, Ohio.
HUMAN RESOURCES AND PERSONNEL COST DATA IN SYSTEM DESIGN TRADEOFFS, AND HOW TO INCREASE DESIGN ENGINEER USE OF HUMAN DATA Final Report

William B. Askren Oct. 1973 20 p refs Presented at the 81st Ann. Conv. of the Am. Psychological Assoc., Montreal, 27-31 Aug. 1973
(AF Proj. 1124)
(AD-770737; AFHRL-TR-73-46) Avail: NTIS CSCL 05/9

A number of studies performed over a period of several years regarding the use of human resources and personnel cost data in system design tradeoffs were analyzed and the results integrated. Five questions were posed and answered. What are system design tradeoffs? What are human resources data? Why should military psychologists be interested in system design tradeoffs and human resources data? How much effect do system design tradeoffs have on human resources and personnel cost? And, what does this have to do with increasing engineer use of human data in design activities? The following conclusions were derived. Tradeoffs are a significant part of the weapon system design process. The choice of design alternative in a tradeoff study would, in many cases, substantially affect the human resources of the organization using the product of the design. It is feasible to use data describing these human resources in design tradeoffs. This use could lead to development of products which make less demand on those resources. Viewing system design as a human decision process involving choice points and options, gives the psychologist an orientation toward design which allows him to more effectively work with the engineer. Author (GRA)

N74-19765# Beta Industries, Inc., Dayton, Ohio.
AN INVESTIGATION OF AUTOMATIC RESTRAINT AND BODY POSITIONING TECHNIQUES Final Report, Oct. 1968 - Jun. 1970
Norman S. Phillips, Richard W. Carr, Thomas J. Wittmann, and Richard S. Scranton Dec. 1973 109 p refs
(Contract F33615-69-C-1099; AF Proj. 7231)
(AD-773857; BII-202-22; AMRL-TR-71-101) Avail: NTIS CSCL 06/7

A unique test apparatus was designed, fabricated and tested which will permit the study of performance limits of automatic restraint and body positioning systems. The program was initiated by a parametric analysis that established the relations that exist between those parameters that dictate the efficacy of an automated system. The study was followed by an investigation of design criteria related to escape sequence timing, optimum positioning, cockpit interface and human tolerance. These data were compiled and used with new principles and techniques of retraction and restraint and led to the design of an automatic test device. The fabricated device is a hydraulically operated system capable of retracting any body segment over its extreme range within 0.100 seconds. (Modified author abstract) GRA

N74-19766# Naval Air Development Center, Warminster, Pa. Crew Systems Dept.
US NAVY DEVELOPMENT OF A MISSION SPECIFIC FIGHTER HELMET. Progress Report
Matthew J. Lamb 10 Dec. 1973 13 p
(AD-773756; NADC-73252-40) Avail: NTIS CSCL 06/1

The Naval Air Development Center is conducting a development program to provide a head protective system specifically designed to meet aircraft applications and mission profiles of the fighter community. The primary design criteria is to minimize the limitations imposed on the pilot's ability to proficiently perform in a high g environment. Author (GRA)

N74-19767# Naval Training Equipment Center, Orlando, Fla. Training Analysis and Evaluation Group.
TRAINING ANALYSIS OF P-3 REPLACEMENT PILOT AND FLIGHT ENGINEER TRAINING Final Report
Robert F. Browning, Leonard E. Ryan, and Paul G. Scott Dec. 1973 122 p refs
(AD-773745; TAEG-10) Avail: NTIS CSCL 05/9

This report is concerned with pilot and flight engineer training at the Replacement Squadron level. It presents the results of: an assessment of the training effectiveness of Operational Flight Trainer, and Cockpit Familiarization Trainer; field tryout of an experimental synthetic and flight syllabus for P-3 replacement pilot training; an economic analysis of the potential savings realizable from an improved instructional strategy; and an analysis of the current flight engineer training syllabus. The requirement for a state-of-the-art P-3C flight simulator incorporating a six-degree of freedom motion platform and a visual system is discussed as are additional tasks that may be trained in this simulator. (Modified author abstract) GRA

N74-20711*# University City Science Center, Philadelphia, Pa.
RESEARCH ON THE EFFECTS OF ALTERED GRAVITY AND OTHER FACTORS ON THE GROWTH AND DEVELOPMENT OF HIGHER PLANTS Final Technical Report
A. H. Brown 21 Nov. 1973 13 p
(Contract NASw-2208)
(NASA-CR-137420) Avail: NTIS HC $4.00 CSCL 06C

The establishment, maintenance and use of the NASA-UCSC Botanical Centrifuge is discussed. The broad goals of this project were: (1) to establish facilities for conducting experiments under conditions of sustained centrifugation; (2) to pursue research on the gravitational physiology of higher plants; (3) to develop experimental hardware suitable for studies of plant development in the weightless condition; and (4) to accomodate visiting investigators whose researches are of interest to the NASA Biomedical Program and who may require for some limited time, the use of a medium size centrifuge with associated facilities appropriate for plant physiological studies. Author

N74-20712*# Michigan Univ., Ann Arbor. Mental Health Research Inst.
SIMULATED WEIGHTLESSNESS IN FISH AND NEUROPHYSIOLOGICAL STUDIES ON MEMORY STORAGE Final Technical Report, 1 Jun. 1969 - 30 Jun. 1973
Rudolf J. VonBaumgarten Dec. 1973 16 p refs
(Grant NGR-23-005-201)
(NASA-CR-137419) Avail: NTIS HC $4.00 CSCL 06C

Simulated weightlessness was used to study the different types of gravity responses in blind fish. It was found that a shift in the direction of low magnitude acceleration in weightlessness causes a rapid 180 deg turn in the blind fish, while a shift in the direction of the applied acceleration in the earth's gravitational field is not significant because of a higher acceleration magnitude threshold than during the zero g condition. This increased responsiveness seems to be explained by a combination of directional sensitivity with a Weber-Fechner relationship of increased receptor sensitivity at diminished levels of background stimulation. Neurophysical studies of the statocyst nerve of the gastropod Mollusc Pleurobranchaea Californica were undertaken in order to understand how complex otolith systems operate. Information storage was investigated on relatively simple neuronal networks in the mollusc Aplysia. Intracellular electrical stimulation of isolated neurons show that a manipulation of autoditonous rhymicity is possible. It was also found that glycolysis and oxidative phosphorylation are involved in inherent rhymicity of Aplysis neurons. S.K.W.

N74-20713*# Food and Drug Administration, Cincinnati, Ohio. Food Research Lab.
ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS Quarterly Progress Reports, 1 Apr. - 30 Sep. 1973
J. E. Campbell, Antolin L. Reyes, A. J. Wehby, R. G. Crawford, J. C. Wimsatt, and J. T. Peeler Sep. 1973 75 p refs
(NASA Order W-13411)
(NASA-CR-136901; QPR-33; QPR-34) Avail: NTIS HC $6.75 CSCL 06M

The mechanism for thermal inactivation of bacterial spores under moist or dry heat was studied. Experimental conditions were established relating to spore loss of heat resistance and loss of optical density as a measure of the rate and extent of germination in spore suspensions. Events occurring during germination were correlated with phase darkening (refractility and non-refractility of spores), stainability characteristics of heat and non-heat treated spores, morphological characteristics, and studies on swelling of spores by an increase in packed cell volume. Author

N74-20714*# Pennsylvania State Univ., University Park. Dept. of Biophysics.
THE PHYSICS OF CELLULAR SYNTHESIS, GROWTH AND DIVISION Final Report
Ernest C. Pollard 21 Jan. 1974 9 p refs
(Grant NGR-39-009-008)
(NASA-CR-136896) Avail: NTIS HC $4.00 CSCL 06A
Three areas of research in NASA'S University Program are described. Primitive terrestrial living cells were studied as a guide to the kind of cells to look for in extraterrestrial life. Experiments in zero gravity conditions are described with emphasis upon effects on small organisms. The effects of ionizing radiation on cells are studied so that it will be possible to predict dosages which can be tolerated by humans with no permanent damage. Author

N74-20715*# Chicago Univ., Ill. Div. of Biological Sciences.
INVESTIGATIONS IN SPACE-RELATED MOLECULAR BIOLOGY Final Report
H. Fernandez-Moran and A. N. Pritzker 27 Mar. 1974 22 p refs Presented at 2d Duran-Reynals Intern. Symp. on Viral Replication and Cancer, Barcelona
(Contract NGL-14-001-012)
(NASA-CR-138075) Avail: NTIS HC $4.25 CSCL 06C
Improved instrumentation and preparation techniques for high resolution, high voltage cryo-electron microscopic and diffraction studies on terrestrial and extraterrestrial specimens are reported. Computer correlated ultrastructural and biochemical work on hydrated and dried cell membranes and related biological systems provided information on membrane organization, ice crystal formation and ordered water, RNA virus linked to cancer, lunar rock samples, and organometallic superconducting compounds. Apollo 11, 12, 14, and 15 specimens were analyzed. G.G.

N74-20716*# Denver Research Inst., Colo. Industrial Economics Div.
A CASE STUDY OF TECHNOLOGY TRANSFER: REHABILITATIVE ENGINEERING AT RANCHO LOS AMIGOS HOSPITAL
William Hildred Jun. 1973 25 p refs
(Contract NASw-2362)
(NASA-CR-138073) Avail: NTIS HC $4.25 CSCL 06P
The transfer of NASA technolgy to rehabilitative applications of artificial limbs is studied. Human factors engineering activities range from orthotic manipulators to tiny dc motors and transducers to detect and transmit voluntary control signals. It is found that bicarbon implant devices are suitable for medical equipment and artificial limbs because of their biological compatibility with human body fluids and tissues. G.G.

N74-20717*# Hawaii Univ., Honolulu. Dept. of Botany.
GROWTH AND DEVELOPMENT IN INERT NON-AQUEOUS LIQUIDS Semiannual Report
S. M. Siegel Jan. 1974 29 p
(Grant NGL-12-001-042)
(Paper-36) Avail: NTIS HC $4.50 CSCL 06C
A preview is presented of the survival and growth capabilities of higher plants in non-aqueous, inert liquids. The two media which were used are mineral (white) oil and fluorochemical inert liquid FC-75. Both liquids dissolve oxygen and carbon dioxide readily, but are insoluble in water. Consequently, plants submerged in these liquids are capable of gas exchange with the atmosphere, but possess a water impermeable coating the dimensions of which are determined by the size of the liquid holding container. In a sense, growing plants in a tank of mineral oil imparts on them a cuticle. Plants plus prescribed volumes of water were innoculated into mineral oil. Organisms with minimal water supplied could then be observed. Also, submersed plants covered with an oil slick were shown to be capable of growth in dessicating atmospheres. Author

N74-20718*# Bethune-Cookman Coll., Daytona Beach, Fla. Dept. of Science and Mathematics.
A STUDY OF LAGOONAL AND ESTUARINE PROCESSES AND ARTIFICIAL HABITATS IN THE AREA OF THE JOHN F. KENNEDY SPACE CENTER Annual Report, Sep. 1972 - Oct. 1973
Premsukh Poonai 8 Apr. 1974 31 p refs Original contains color illustrations
(Grant NGR-10-022-001)
(NASA-CR-137409; AR-1) Avail: NTIS HC $4.75 CSCL 06C
In order to study the influence of an artificial habitat of discarded automobile tires upon the biomass in and around it, three sites were selected in the Banana River, one of which will serve as a control and the other two as locations for small tire reefs. Measurements and correlation studies of the biomasses and the species indicate that the biodynamics of the sites are appreciably the same in the three cases, that there are probably adequate populations at the lower trophic levels, that there are perhaps reduced numbers of upper level carnivores, and that it is likely that small artificial havens can contribute to an increase in populations of certain species of gamefish. Author

N74-20719*# Xavier Univ. of Louisiana, New Orleans. Dept. of Biology.
SOME CHARACTERISTICS OF FRUCTOSE 1,6-DIPHOSPHATASE ACTIVITY IN RAT LIVER
Portia U. Ashman, S. L. Lampkin, Lynette Dillon, and Rebecca Parks [1974] 30 p refs
(Grants NGR-19-007-004; RR-08008)
(NASA-CR-137415) Avail: NTIS HC $4.50 CSCL 06C
A reliable assay for hepatic fructose 1,6-diphosphatase in the rat was developed. It was found that the greatest enzymic activity and highest protein levels were eluted from the colored portion of the homogenate. When the substrate concentration was 0.01M, the enzyme had optimal activity when incubated with 0.01M $MgSO_4$ for 10 min. at 37 C in 0.05M Tris-HCl buffer, pH 7.5. Specificity for the substrate, fructose 1,6-diphosphate, was obtained at substrate concentration of 0.01M. Author

N74-20720# Advisory Group for Aerospace Research and Development, Paris (France).
AIRSICKNESS IN AIRCREW
T. G. Dobie (Leeds Univ.) Feb. 1974 75 p refs
(AGARD-AG-177; AGARDograph-177) Avail: NTIS HC $6.75
The problem of airsickness is examined in terms of loss of useful training time. Figures are presented which are likely to be typical of those which occur in any modern Air Force. Various methods of reducing this incidence are discussed, as well as an approach to the management of flying personnel with airsickness. The signs and symptoms of airsickness are described. The aircraft maneuvers which are most likely to induce airsickness are analyzed. Author

N74-20721*# Techtran Corp., Glen Burnie, Md.
THE EFFECT OF HYPODYMANIA AND HYPOKINESIS ON THE ARTERIAL TREE OF THE PELVIC MUSCLES OF THE RABBIT'S EXTREMITIES
N. Ye. Sokolov Washington NASA May 1974 7 p refs Transl. into ENGLISH from Arkh. Anat. Gistol. Embriol. (USSR), v. 67, no. 4, Apr. 1972 p 48-52
(Contract NASw-2485)
(NASA-TT-F-15511) Avail: NTIS HC $4.00 CSCL 06C
Effects of hypodynamic conditions on the arterial bed in the muscles and adjacent structures of pelvic extremities in the rabbit were investigated. Anatomical methods of investigation revealed that hypodynamic conditions produced morphological transformations in intraorganic arterial system in the muscles, fascia and adipose cellular tissue of the immobilized extremity. These changes proved to be stable and retained during 6 months. Author

N74-20722*# Scientific Translation Service, Santa Barbara, Calif.
PROJECTIONS OF THE AMPULLARY CRISTAE OF THE UTRICLE IN THE PRIMARY CENTERS OF THE VESTIBULE. MICROPHYSIOLOGICAL STUDY AND ANATOMOFUNCTIONAL CORRELATIONS
Alain Sans, Jacqueline Raymond, and Robert Marty Washington

NASA Apr. 1974 25 p refs Transl. into ENGLISH from Brain Res. (Amsterdam), no. 44, 1972 p 337-355
(Contract NASw-2483)
(NASA-TT-F-15521) Avail: NTIS HC $4.25 CSCL 06P

Electric stimulation using electric shocks of the different branches of the vestibular nerve is employed to determine the existence of vestibulotopia in the laterial medial and descending vestibular centers. The diameters of the vestibular nerve fibers were measured and the potentials were registered in order to establish anatomofunctional correlations. Author

N74-20723# Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
ANALYSIS OF PHYSIOLOGICAL SYSTEMS BY PARAMETER ESTIMATION TECHNIQUES
J. A. Blom May 1973 40 p refs
(TH-73-E-36; ISBN-90-6144-036-X) Avail: NTIS HC $5.00

Parameter estimation techniques were used to analyze physiological systems, the ultimate goal being to predict a patient's reaction to drug administration quantitatively so that optimal therapy can be applied. Basic notions of physiological systems like state and optimal state are formalized. Both dynamic and nonlinear patient models are considered, and parameter estimation for these models are discussed. Dual control and automated intensive care are dealt with and simulation results are presented. ESRO

N74-20724# Wayne State Univ., Detroit, Mich. Biomechanics Research Center.
THE DYNAMIC RESPONSE OF THE SPINE DURING + Gz ACCELERATION Annual Report, 15 Mar. 1972 - 31 Jul. 1973
P. Prasad and A. I. King 30 Nov. 1973 257 p refs
(Contract N00014-69-A-0235-0001; NR Proj. 105-540)
(AD-772604) Avail: NTIS CSCL 06/19

The report reviews previous results and presents qualitative as well as quantitative experimental evidence of the existence of a dual load path in the human spine - one through the intervertebral disc and the other through the articular facets. A 78 degree-of-freedom mathematical model is proposed. Its results compare favorably with those from experimental measurements on three cadaveric spines subjected to Gz acceleration.
Author (GRA)

N74-20725* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
REDUCED GRAVITY FECAL COLLECTOR SEAT AND URINAL Patent
Jeri Wexler Brown, inventor (to NASA) Issued 23 Apr. 1974 5 p Filed 15 Mar. 1973 Supersedes N73-20141 (11 - 11, p 1249)
(NASA-Case-MFS-22102-1; US-Patent-3,805,303;
US-Patent-Appl-SN-341621; US-Patent-Class-4-10;
US-Patent-Class-4-120) Avail: US Patent Office CSCL 06I

A waste collection system for use in a reduced gravity including a seat having an opening centrally located with a pair of opposed depressed valleys on opposite sides of said opening for accommodating the ischial tuberosities of a user. The seat has contoured surfaces for providing support of the user's body and includes a prominent ridge towards the rear, which provides forward-aft positioning cue to the user. A curved recess is provided adjacent the forward portion of the seat for accommodating a tubular urinal having an enlarged open mouth.
Official Gazette of the U.S. Patent Office

N74-20726* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ULTRASONIC BIOMEDICAL MEASURING AND RECORDING APPARATUS Patent
Robert D. Lee, inventor (to NASA) Issued 9 Apr. 1974 9 p Filed 18 Aug. 1972 Supersedes N72-31116 (10 - 22, p 2923)
(NASA-Case-ARC-10597-1; US-Patent-3,802,253;
US-Patent-Appl-SN-281876; US-Patent-Class-73-67.9;
US-Patent-Class-128-2V) Avail: US Patent Office CSCL 06B

A train of ultrasonic pulses is beamed into the body of an animal. Organs intercepted by the beam reflect echo pulses following each transmitted pulse. An electronic gate with a variable width and a variable time delay relative to the transmitted pulse is utilized for selecting echoes derived from other organs or portions of organs. The integral of the echo signals received within the first half of the gate period is subtracted from a corresponding integral of the echo signal received during the second half of the gate to derive an error signal for controlling the time delay of the gate. In this manner, the selected echo signal is always maintained in the center of the gate.
Official Gazette of the U.S. Patent Office

N74-20727 Illinois Univ., Urbana.
A PARAMETRIC STUDY OF PILOT PERFORMANCE WITH MODIFIED AIRCRAFT CONTROL DYNAMICS, VARYING NAVIGATIONAL TASK COMPLEXITY, AND INDUCED STRESS Ph.D. Thesis
Emmett Francis Kraus 1973 113 p
Avail: Univ. Microfilms Order No. 74-5614

Experiments were conducted in a Link GAT-2 to evaluate the effectiveness of a system providing direct control over aircraft maneuvering performance. Pilots performed complex navigational tasks involving the use of a computer-assisted area navigation system. Changing waypoint storage capacity of the simulated navigation system induced variable task loading on subjects. The experiment was replicated with and without a self-adaptive side task to determine levels of residual attention associated with the control modifications and the varying workload levels. The flight performance controller yielded greater precision of maneuvering control, fewer procedural blunders, and an increased level of residual pilot attention. The side task proved to be a reliable discriminator to changes in workload associated with small changes in system design and task complexity. Dissert. Abstr.

N74-20728* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METABOLIC ANALYZER Patent
John A. Rummel and Cortes L. Perry, inventors (to NASA) Issued 26 Mar. 1974 13 p Filed 26 Dec. 1972 Supersedes N73-15156 (11 - 06, p 0635)
(NASA-Case-MFS-21415-1; US-Patent-3,799,149;
US-Patent-Appl-SN-318152; US-Patent-Class-128-2.07;
US-Patent-Class-73-23; US-Patent-Class-73-421.5R;
US-Patent-Class-128-2.08) Avail: US Patent Office CSCL 06B

An apparatus is described for the measurement of metabolic rate and breathing dynamics in which inhaled and exhaled breath are sensed by sealed, piston-displacement type spirometers. These spirometers electrically measure the volume of inhaled and exhaled breath. A mass spectrometer analyzes simultaneously for oxygen, carbon dioxide, nitrogen and water vapor. Computation circuits are responsive to the outputs of the spirometers, mass spectrometer, temperature, pressure and timing signals and compute oxygen consumption, carbon dioxide production, minute volume and respiratory exchange ratio. A selective indicator provides for read-out of these data at predetermined cyclic intervals.
Official Gazette of the U.S. Patent Office

N74-20729*# Rancho Los Amigos Hospital, Inc., Downey, Calif. Amputee and Fracture Service.
INVESTIGATION OF THE MEDICAL APPLICATIONS OF THE UNIQUE BIOCARBONS DEVELOPED BY NASA Final Project Report
Vert Mooney 31 Aug. 1973 41 p
(Contracts NAS8-28620; NAS8-28117)
(NASA-CR-120194) Avail: NTIS HC $5.25 CSCL 06E

The biocompatibility of percutaneous endoskeletal fixation devices made from carbon compounds, and their applications are considered. The clinical application of these carbons to solve human problems is demonstrated and the nature of myoelectric simulation by carbon implants is studied. G.G.

N74-20730# Technische Hogeschool, Delft (Netherlands). Afdeling der Werktuigbouwkunde.
MAN-MACHINE SYSTEMS GROUP Progress Report, Jan. 1970 - Jan. 1973
H. G. Stassen, P. L. Brinkman, J. S. M. J. VanDieten, M. F. W. Dubois, J. J. Kok, A. VanLunteren, W. C. J. Moolenaar, A. J. DeRon, H. A. UdodeHaes, and W. Veldhuyzen Nov. 1973 328 p refs
(WTHD-55) Avail: NTIS HC $19.50

The research activities are reported for the period of January to October 1972. Topics discussed include: systems identification, function methods, bicycle simulator, tacticle tracking, modeling the helmsman of a supertanker, human adaptive control, and studies of the electroencephalogram of the human operator.
F.O.S.

N74-20731*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RIDE QUALITY - AN EXPLORATORY STUDY AND CRITERIA DEVELOPMENT
Ralph W. Stone, Jr. Feb. 1974 34 p refs
(NASA-TM-X-71922; L-9296) Avail: NTIS HC $4.75 CSCL 05E

The Langley six degree of freedom visual motion simulator has been used to measure subjective response ratings of the ride quality of eight segments of flight, representative of a wide variation in comfort estimates. The results indicate that the use of simulators for this purpose appears promising. A preliminary approach for the development of criteria for ride quality ratings based on psychophysical precepts is included. Author

N74-20732# Advisory Group for Aerospace Research and Development, Paris (France).
THE USE OF NYSTAGMOGRAPHY IN AVIATION MEDICINE
Fred E. Guedry, Jr., ed. (Naval Aerospace Med. Res. Inst.) Dec. 1973 184 p refs Partly in FRENCH and in ENGLISH Presented at the AGARD Aerospace Med. Panel Specialists Meeting, Pensacola, Fla., 14-15 May 1973
(AGARD-CP-128) Avail: NTIS HC $12.25

Laboratory and clinical application techniques of nystagmography are reported with emphasis on motion sickness, spatial disorientation, and vertigo as experienced by flying personnel and divers. For individual titles, see N74-20733 through N74-20755.

N74-20733 Tulane Univ., New Orleans, La. School of Medicine.
CLINICAL APPLICATION OF NYSTAGMOGRAPHY
Wallace Rubin *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 3 p (For availability see N74-20732 12-05)

There are two specific clinical advantages of electronystagmography (ENG): (1) It is possible to detect spontaneous and positional nystagmus that would not be seen without its use; and (2) it is possible to differentiate peripheral from central pathology, and right sided from left sided peripheral lesions, when there is a spontaneous nystagmus. Author

N74-20734 Minnesota Univ., Minneapolis. School of Medicine.
PRACTICAL PROBLEMS IN CLINICAL NYSTAGMOGRAPHY. 1. GUIDELINES FOR SELECTION OF EQUIPMENT
Mary Jayne Capps *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 3 p refs

The basic equipment needed for a thorough evaluation of the vestibular system includes an examination chair or table, a polygraphy suitable for recording nystagmus, a device for producing caloric stimuli, and an optokinetic stimulator. The required and optional features of each of these devices have been discussed. The basic equipment will permit the elicitation and recording of the various types of eye movements, i.e., caloric, optokinetic, positional, and spontaneous nystagmus. The evaluation of these phenomena provides a sufficiently complete picture of the state of the vestibular system. Author

N74-20735 Ohio State Univ., Columbus. Coll. of Medicine.
PRACTICAL PROBLEMS IN CLINICAL NYSTAGMOGRAPHY. 2. SOURCES OF ERROR
Charles W. Stockwell and William E. Collins (FAA, Oklahoma City) *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 10 p refs

The value of clinical nystagmography can be greatly diminished if certain errors are not recognized and avoided. Some errors are introduced by faulty recording techniques, including inadequate calibration, inappropriate choice of frequency filters, and failure to identify artifacts. Other errors are due to the extreme sensitivity of the nystagmus response to extravestibular influences. Caloric testing errors include inadequate stimulus control and failure to account for directional preponderance. These and other errors in nystagmography are pointed out and discussed, and corrective measures are suggested. Author

N74-20736 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
USE OF NYSTAGMOGRAPHY IN THE STUDY OF AIRCREW WITH SPATIAL DISORIENTATION
A. J. Benson *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 13 p refs

Lateral nystagmus evoked by a stopping stimulus of 60 deg/sec was recorded by electro-oculography in 133 aircrew who had come under medical care because of airsickness, spatial disorientation, or other sensory disturbances in flight without illusory perception of aircraft orientation. Measures of the slow phase velocity, the time constant of decay and total amplitude of the post-rotational nystagmus, did not differ between the three groups. Measures of directional preponderance were found to have differences in variance structure between the groups. Measures of directional preponderance were found to have differences in various structure between the groups, but these were not well defined and hence of limited value in the selection or assessment of individual aircrew. Author

N74-20737 Centre Principal d'Expertises Medicales du Personnel Navigant, Paris (France).
A PROPOSED HABITUATION LABYRINTH (PRESENTATION OF SEVERAL RESULTS WITH THE P.N.T) [A PROPOS DE L'HABITUATION LABYRINTHIQUE (PRESENTATION DE QUELQUES RESULTATS CHEZ LA P.N.T.)]
A. Gibert, P. Blanc, E. Lafontaine, P. Pialoux, and P. Fontelle *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 7 p In FRENCH

Several methods, with special emphasis on damp sinusoidal stimulation, used to study labyrinth are introduced. Data are also given on the possible application of these methods in aeronautical and aerospace medicine. Habituation phenomena using the personnel navigation technique are given as well as information obtained by observing the phenomena in the course of professional apprenticeship. The possibility of observing the equilibration function during professional life, particularly during the course and abatement of the central peripheral vertiginous syndrome was discussed. Transl. by E.H.W.

N74-20738 Hopital d'Instruction des Armees, Versailles (France).
INTEREST OF NYSTAGMOGRAPHY IN FLYING NAVIGATION PERSONNEL [INTERET DE LA NYSTAGMOGRAPHIE DANS LE PERSONNEL NAVIGATION DE L'AVIATION]
L. R. Bordes *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 6 p In FRENCH

The use of electronystagmography to diagnose psycholabyrinth, hyporeflective and barotrumatism vestibula, and peripherial, radicular, and central syndromes in navigation personnel is discussed. Test results are included along with data on the possible use of the method as an aid in selecting navigation personnel.
Transl. by E.H.W.

N74-20739 Italian Air Force Aerospace Medical Center, Rome.
A CONTRIBUTION TO THE ELECTRONYSTAGMOGRAPHIC

METHOD CONCERNING THE INTERPRETATION OF NYSTAGMUS CHARACTERISTICS
C. Koch *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 5 p refs

The evaluation of nystagmic characteristics is stressed, both from a quantitative and qualitative standpoint. Descriptions of some of them (amplitude, frequency, duration) are given, the importance of which is well known as far as vestibular semiology and diagnostics are concerned. A new formula is proposed concerning the interpretation of the electronystagmographic recording. This formula makes it easier to define the nystagmus in degrees, thus constituting a basis for its classification. Author

N74-20740 Illinois Univ., Chicago. Abraham Lincoln School of Medicine.
DIFFERENTIAL DIAGNOSIS OF THE CALORIC NYSTAGMUS
Nicholas Torok *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 11 p refs

Diagnostic considerations based upon the nystagmogram are limited. Quantitative assessment of horizontal canal sensitivity is available through the use of culmination frequency or culmination slow phase velocity. Three distinctive qualitative features of the caloric nystagmus were evaluated and were found to be suggestive or outrightly pathognomonic for retrolabyrinthine or central nervous system abnormalities. These are: (1) vestibular decruitment; a disproportionate caloric responsiveness when a weak stimulus elicits a more intense nystagmic reaction than a strong stimulus is capable of creating; (2) hyperactive vestibular responsiveness; and (3) ocular fixation reversal phenomenon. Elimination of fixation decreases the nystagmus intensity instead of facilitating the evoked nystagmus. Author

N74-20741 McGill Univ., Montreal (Quebec). Dept. of Physiology.
NYSTAGMOGRAPHY: A USEFUL TOOL IN BASIC AND APPLIED INVESTIGATIONS
G. Melvill Jones *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 13 p refs

Relatively gross eye movements are considered: in particular, (1) quick, saccadic, gaze shifts from one fixation point to another; (2) the relatively slow smooth pursuit movements associated with following a fixation point which is moving relative to the head. In many circumstances these two types of movement are integrated to produce a combined pattern of eye movement suitable for intermittent fixation on a visual field which is moving relatively to the head. Methods of recording nystagmus and its data reduction are discussed, together with their applicability and hazards, in relation to intended objectives. The experimental use of nystagmography is treated in terms of quick and slow phase eye movements and of head movements. Author

N74-20742 Toronto Univ. (Ontario). Dept. of Otolaryngology.
OPTOKINETIC NYSTAGMUS: ITS VALUE IN THE DIAGNOSIS OF CERTAIN VESTIBULAR LESIONS
Y. Morissette, S. M. Abel, and H. O. Barber *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 6 p refs

Optokinetic nystagmus (OKN) was studied to explore its value in the localization of vestibular lesions. The stimulus consisted of a field of equidistant, parallel black bars - either horizontal or vertical - moving across a white ground. The data showed that for subjects with normal vestibular function and unilateral labyrinthectomy, the slow phase velocity of OKN varied nonmonotonically with increases in the speed of the bars between 20 and 400 degrees of visual angle per second. This function reached a single maximum at approximately 60 to 80 degrees of bar velocity for horizontal OKN and at 40 degrees for vertical OKN. In subjects with neurological confirmed lesions of brain stem due to multiple sclerosis, tumor or ischemic disease, the slow phase velocity of OKN did not change, but remained constant at about 20 degrees/sec. across the range of bar velocities studied. Author

N74-20743 Mount Sinai Medical and Graduate Schools, New York. Dept. of Neurology.
VISUAL-VESTIBULAR INTERACTION: THE ROLE OF THE LABYRINTH IN THE PRODUCTION OF OPTOKINETIC NYSTAGMUS AND OPTOKINETIC AFTER-NYSTAGMUS
B. Cohen, S. Takemori, and T. Uemura *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 4 p refs

OKN and OKAN were affected by unilateral and bilateral labyrinthectomy. The maximum velocity of slow phases of OKN induced by drum rotations above 60-75 deg/sec in either direction was lower after unilateral and bilateral labyrinthectomy. The frequency of OKN was also decreased, and the total deviation of the eyes was reduced for OKN induced by these drum speeds. Changes in OKN eventually recovered. OKAN was reduced in duration after unilateral labyrinthectomy, being initially shorter to the ipsilateral than to the contralateral side. OKAN could no longer be evoked after bilateral labyrinthectomy. This loss was permanent. These data demonstrate the importance of the vestibular system in maintenance of OKN and OKAN. Author

N74-20744 Freiburg Univ. (West Germany). Dept. of Neurology and Neurophysiology.
SELF-MOTION SENSATION, PSEUDO-CORIOLIS EFFECTS AND MOTION SICKNESS INDUCED BY OPTOKINETIC STIMULI
Johannes Dichgans and Thomas Brandt *In* AGARD The Use of Nystagmorgraphy in Aviation Med. Dec. 1973 3 p refs

Psychophysiological experiments reported establish that the human sensation of self-motion is evoked by stimulation of the labyrinthine receptors as well as by excitation of the visual sense. Circularvection, pseudo-coriolis effect, and visually induced tilt of the apparent vertical produce oculogravic motion illusions and motion sickness phenomena due to vestibular-visual interaction. G.G.

N74-20745 Miami Univ., Oxford, Ohio. Dept. of Psychology.
EFFECTS OF SOUND ON THE VESTIBULAR SYSTEM
D. E. Parker, M. F. Reschke, and R. L. Tubbs *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 12 p refs
(Contracts F33615-69-C-1246; F33615-73-C-4002)

The effects of sound on the vestibular systems of guinea pigs and monkeys were studied. Sound stimuli included: (1) Pressure transients; (2) infrasounds, and (3) intense audiofrequency sound. Biomechanical and physiological responses to these three types of stimuli were observed. Biomechanical responses examined included stape displacement and perilymph pressure changes. Vestibular nerve activity, eye movements, and head movements are the physiological responses that were recorded. Monkey responses differed from guinea pig responses under several conditions; response differences suggest different mechanisms of acoustical vestibular stimulation in these two species. Author

N74-20746 Florida Univ., Gainesville. Div. of Otolaryngology.
NORMAL LIMITS FOR THE SEQUENTIAL BITHERMAL BINAURAL CALORIC TEST
Franklin O. Black, David D. Custer (Tech.-Vocational Inst.), William G. Hemenway (Colo. Univ.), and John I. Thornby *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 9 p refs

Analysis of bithermal binaural caloric test results gave a statistically significant response difference between ears for right handed normal subjects. There were no significant response differences due to temperature of stimulation and ear stimulated. Three tests for the determination of caloric nystagmus response abnormalities were developed, based upon analysis of intrasubject normal responses. A retrospective examination of caloric responses from patients with Meniere's disease provided preliminary support for clinical feasibility and increased sensitivity of the statistical methods advocated for clinical usage. Author

N74-20747 Mainz Univ. (West Germany). Dept. of Physiology.
HUMAN EYE MOVEMENTS DURING VARIOUS FORMS OF LINEAR ACCELERATION AND WEIGHTLESSNESS
R. J. VonBaumgarten, R. Thumler (Mich. Univ.), G. L. Shillinger, Jr. (NASA. Ames Res. Center), and G. Baldrighi (Mich. Univ.) *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 3 p refs

Eye movements of human subjects were recorded electronystagmographically in complete darkness during rectilinear horizontal accelerations as achieved in cars on the ground and also during aircraft parabolic flight. The results were compared to the movements of blinded goldfish subjected to similar changes of gravitoinertial forces. The results indicate that there is a human correlation with the gravity reference response of fish. During horizontal forward accelerations on the ground the human eyes turn downward and during horizontal backward acceleration the eyes turn upward. The human eye response to g-loads below 1 g and to weightlessness is the reverse of the tilt of the fish. While fish dive down during low g, or loop forward during weightlessness, the eyes of subjects sitting upright in an aircraft which flies at 0 g move upward. Author

N74-20748 Ludwig-Maximilians-Universitat, Munich (West Germany).
THERMOELECTRIC STIMULATION OF THE LABYRINTH
Hans Scherer *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 5 p

A new method of caloric labyrinth stimulation is described. The use of water as a stimulator is replaced by a copper plug positioned in the external ear canal. The plug's temperature is regulated by Peltier thermoelectric plates which are connected with a power supply and are able to produce on one of their sides either heat or cold. Every temperature necessary to stimulate the labyrinth can be applied. Electronic steering and the automatization of the whole test are easily applicable. The new method is especially useful in patients with lesions of the ear drum. Several typical examples of thermoelectric stimulation of the labyrinth and the nystagmic response are shown. Author

N74-20749 Ulm Univ. (West Germany). Dept. of Neurology.
COMPUTER-ELECTRONYSTAGMOGRAPHY IN EVALUATING THE INFLUENCE OF PSYCHO-PHARMACOLOGICAL DRUGS ON VIGILANCE
Juergen C. Aschoff and Wolfgang Becker *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 8 p refs

Maximum velocity and duration of saccadic eye movements depend entirely on the magnitude of angular deflection of the eye ball, and on the state of alertness or fatigue. Tranquilizing drugs such as Diazepam are known to reduce significantly the maximum velocity, but accuracy and reaction time of these eye movements deteriorate, too. For evaluating these drugs, an on-line computer program has been developed whereby 500 saccadic eye movements are computed for their maximum velocity, duration, accuracy and reaction time. All desired parameters are plotted in amplitude subgroups with mean values + or - standard deviation. Various drugs have been tested using this method including a powerful new antidepressant drug Sulpiride. This antidepressant psychopharmakon showed no influence on velocity and reaction time and may even enhance accuracy of saccadic eye movements. Author

N74-20750 School of Aerospace Medicine, Brooks AFB, Tex. Clinical Sciences Div.
AEROMEDICAL RESEARCH AND CLINICAL APPLICATIONS OF AVERAGING TECHNIQUES IN NYSTAGMOGRAPHY
James W. Wolfe *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 6 p refs

A system employing analog-to-digital techniques has been developed for simultaneously measuring the average slow and fast phase velocity of the summated response and left and right eye movements separately and for precisely resolving both of these variables. This method is described along with illustrative cases. Preliminary results indicate that this approach may be useful in differentiating peripheral and central vestibulo-oculomotor pathology. Author

N74-20751* Massachusetts Inst. of Tech., Cambridge. Man-Vehicle Lab.
AUTOMATED NYSTAGMUS ANALYSIS
Charles M. Oman, John H. J. Allum, John R. Tole, and Laurence R. Young *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 9 p refs

(Grants NGR-22-009-025; NGR-22-009-156; NGR-22-009-701)

Several methods have recently been used for on-line analysis of nystagmus: A digital computer program has been developed to accept sampled records of eye position, detect fast phase components, and output cumulative slow phase position, continuous slow phase velocity, instantaneous fast phase frequency, and other parameters. The slow phase velocity is obtained by differentiation of the calculated cumulative position rather than the original eye movement record. Also, a prototype analog device has been devised which calculates the velocity of the slow phase component during caloric testing. Examples of clinical and research eye movement records analyzed with these devices are shown. Author

N74-20752 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
A MODEL FOR THE PREDICTION OF THE NYSTAGMIC RESPONSE TO ANGULAR AND LINEAR ACCELERATION STIMULI
G. R. Barnes and A. J. Benson *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 13 p refs

A model has been developed for the mechanism of saccadic generation in the vestibulo-ocular reflex arc, in an attempt to explain variations in the pattern of nystagmic response to vestibular stimulation. The model has been developed using an analogue computer and an attempt has been made to relate the system to the known physiological evidence. The response of the model has been compared with results from experiments on human subjects, and satisfactory agreement has been obtained in conditions appropriate to stimulation of the canals by both periodic and transient angular accelerations and to stimulation of the utricular maculae by linear acceleration. The model effectively simulates the changes in frequency and duration of slow phase and saccadic eye movements observed experimentally. Author

N74-20753 Royal Australian Navy School of Underwater Medicine, Balmoral.
VERTIGO IN DIVING
Carl Edmonds *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 10 p refs

Because vertigo is associated with nystagmus and this can be demonstrated in an objective manner, it has been attempted to differentiate the specific causes of vertigo from those of disorientation in general. It is fully appreciated that there is a strong correlation between these two symptoms. An aetiological classification of vertigo in diving is reported that considers aspects of unequal vestibular stimulation as well as unequal vestibular responses. Author

N74-20754 Duke Univ., Durham, N.C. Div. of Otolaryngology.
COCHLEAR AND VESTIBULAR INJURIES DURING DIVING
Joseph C. Farmer, Jr. *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 8 p refs

Cochlear and vestibular damage can occur during all phases of diving. Inner ear damage during compression seems to be related to difficulties with middle ear pressure equalization while such damage occurring at stable deep depths seems to be related to experimental changes in inspired inert gas composition. Cochlear and vestibular damage during decompression seems to be a form of decompression sickness and can be the only

manifestation of this problem. Twenty cases of such damage are presented in which there is a significant correlation between prompt recompression treatment and lack of residual deficites. Excessive noise is not uncommon during various diving conditions and can lead to temporary and presumably permanent auditory thresholds shifts. Author

N74-20755 Lund Univ. (Sweden). ENT-Dept.
EFFECTS OF INCREASED MIDDLE EAR PRESSURE ON THE VESTIBULAR SYSTEM
Oerjan Tjernstroem *In* AGARD The Use of Nystagmography in Aviation Med. Dec. 1973 9 p refs

A technique is described for measuring changes in pressure in the middle ear. Fitted to the external ear canal is a rubber cuff which contains a small tube. A flowmeter, parallel with the tube, detects airflow between the external ear canal and the ambient air. The airflow is compared electronically with a reference airflow in another tube which emanates from an adjustable reference volume. By recording in this manner in a pressure chamber, pressure changes in the middle ear could be related to report vertigo and also to recorded nystagmus. Results indicate that alternobaric vertigo (A.V.) may occur with only moderate pressure changes and that some subjects who would otherwise be regarded as normal are especially susceptible to A.V., apparently as a result of a high forcing pressure on one side. Author

N74-20756# Advisory Group for Aerospace Research and Development, Paris (France).
ESCAPE PROBLEMS AND MANOEUVRES IN COMBAT AIRCRAFT
Walton L. Jones, ed. (NASA, Washington, D. C.) Feb. 1974 121 p refs Papers Presented at Aerospace Med. Panel Specialists, Soesterberg, Netherlands, 4 Sep. 1973
(AGARD-CP-134) Avail: NTIS HC $9.25

The proceedings of a conference on the subject of problems of escape from rotary wing and V/STOL aircraft are presented. The purpose of the meeting was to delineate the important aspects of the escape problems and to review new concepts in escape technology. The subjects covered was broad ranging from biomedical issues in air combat mishaps in high performance aircraft to human factors and engineering aspects of inflight escape in all types of aircraft. For individual titles, see N74-20757 through N74-20772.

N74-20757* National Aeronautics and Space Administration, Washington, D.C.
TECHNICAL EVALUATION OF THE AEROSPACE MEDICAL PANEL SPECIALISTS MEETING ON ESCAPE PROBLEMS AND MANOEUVRES IN COMBAT AIRCRAFT
Walton L. Jones *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 6 p

A technical evaluation of the papers presented at a conference on escape systems for helicopters and V/STOL aircraft was made. The subjects discussed include the following: (1) bioengineering aspects of spinal injury during ejection, (2) aerodynamic forces acting on crewman during escape, (3) operational practicality of fly away ejection seats, (4) helicopter survivability requirements, (5) ejection experience from V/STOL aircraft, and (6) research projects involving escape and retrieval systems. Author

N74-20758 Bureau of Medicine and Surgery, Washington, D.C.
SPECIFIC BIOMEDICAL ISSUES IN THE ESCAPE PHASE OF AIR COMBAT MISHAPS DURING SOUTHEAST ASIA OPERATIONS
Robert E. Kinneman, Jr., Martin G. Every (BioTechnology, Inc., Falls Church, Va.), and James F. Parker, Jr. (BioTechnology, Inc., Falls Church, Va.) *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 7 p refs

Escape and rescue data were collected from Navy airmen downed over Southeast Asia in order to isolate significant biomedical problems associated with the combat mishap. Subjects consisted of naval aviators flying fixed-wing jet aircraft who were forced to eject as a direct result of enemy action. One hundred and fifteen survivors of such an occurrence were located and administered an extensive questionnaire covering the circumstances associated with the escape and all events prior to and during rescue. Particular attention was given to the adequacy of escape and rescue systems under Southeast Asia combat conditions. This paper deals with the analyses that were conducted in order to determine specific cause and effect relationships for injuries incurred during the ejection phase of this event. Conclusions of the study deal with the adequacy of escape equipment and procedures, under the conditions and stresses inherent in combat situations. Author

N74-20759 Naval Aerospace Medical Research Lab., New Orleans, La.
BIOENGINEERING ASPECTS OF SPINAL INJURY IN THE OV-1 (MOHAWK) AIRCRAFT c04
Channing L. Ewing and Daniel J. Thomas *In* AGARD Escape Probl and Manoeuvres in Combat Aircraft Feb. 1974 9 p refs

An investigation of non-fatal ejection verterbral fracture encountered during ejection from military aircraft was conducted. The causes for the injuries are analyzed. Laboratory procedures for determining the factors which contribute to spinal injuries during ejection are reported. It was concluded that the restraint harness used in the OV-1 aircraft was responsible for the high incidence of spinal injuries encountered by crewmen ejecting from this aircraft. Author

N74-20760 Naval Aerospace Medical Research Lab., New Orleans, La.
HEAD CLEARANCE ENVELOPE FOR EJECTION SEATS DURING NEGATIVE G sub x IMPACT ACCELERATION
Channing L. Ewing *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 3 p refs

Living volunteers from the U.S. Army participated in a research program designed to determine response of the living human head and neck to impact acceleration in 1967-1969. The restraint system used was typical of that described above and included a 3-inch lap belt, and inverted V, and shoulder straps. The seat was an experimental seat with the level steel seat pan parallel with the ground and the steel seat back vertical to the seat pan. The shoulder harness in all cases came straight out from the seat back to the shoulder via an adjustable spreader and then downward across the clavicles to the lap belt. The subjects so restrained were given a minus G sub x impact acceleration with fixed rate of onset and with fixed peak acceleration. The run selected for this study was that performed by an 88th percentile sitting height subject (relative to U.S. Navy pilot data), at 10G, 800G/sec with a triangular pulse, lasting about 400 ms. The subject was fitted with transducer mounts on the top of the head; mouth; and base of the neck. These mounts were rigidly attached to the anatomy and photographic targets were attached to each mount, with two targets separated by several inches attached to the neck mount. Author

N74-20761 Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
AN ASSESSMENT OF AERODYNAMIC FORCES ACTING ON THE CREWMAN DURING ESCAPE
James W. Brinkley and Peter R. Payne (Payne, Inc., Annapolis) *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 10 p refs

The results of analytical and experimental research accomplished to determine the magnitude of the aerodynamic forces acting on the crewman during emergency escape are summarized. The work has been directed toward the definition of the mechanisms of aerodynamic flail injury and the acquisition of data required for the development of protective countermeasures. The results of a study of noncombat ejection experience within the U.S. Air Force during the period of 1964 to 1972 are also reviewed. This study was conducted to identify injuries attributed to aerodynamic loads and to statistically describe the probability of these injuries as a function of aircraft speed at the time of ejection. Wind tunnel experiments are described which were conducted to measure the forces acting on body segments using

volunteer human subjects. Both open ejection seat and tractor rocket extraction egress systems were studied. The data collected from these experiments includes whole body and body segment aerodynamic forces. Operational variables such as arm and leg position and clothing were evaluated to determine their relative effects on the aerodynamic loads acting on the subject's limbs. Author

N74-20762 Naval Aerospace Recovery Facility, El Centro, Calif.
AEROMEDICAL RESEARCH AND EVALUATION SUPPORT OF EXISTING AND PROPOSED ESCAPE AND RETRIEVAL SYSTEMS AT THE NAVAL AEROSPACE RECOVERY FACILITY
Donald H. Reid *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 8 p refs

A research facility for conducting physiological research with parachutists and for investigating hardware system/human performance interface problems is described. The objective of the research projects has been to contribute data which are needed by the engineering disciplines in designing and developing new generation retardation and recovery systems which are acceptable from the human engineering standpoint. Specific programs in human factors engineering of emergency equipment for air crew use are reported. Author

N74-20764 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
EJECTION EXPERIENCE FROM VTOL MILITARY AIRCRAFT
D. C. Reader *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 3 p

A statistical analysis of ejections from the Harrier aircraft is presented. The data are contained in a table which describes the conditions for the fourteen successful and four fatal ejections on record. It is stated that the majority of the ejections occurred at low speed and low altitude with the aircraft sinking and/or banked. Author

N74-20765 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
CLEARANCE OF EJECTION PATH BY THE USE OF EXPLOSIVE CORD
A. J. Barwood *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 6 p

The use of miniature detonating cord (MDC) for removing an aircraft canopy prior to ejection is discussed. The design of the MDC and the installation on specific aircraft are described. The main points in favor of using MDC are: (1) it rapidly clears the ejection path, (2) it breaks the central area of the canopy into small fragments thus avoiding major impact on ejecting crew members, and (3) all canopy debris flies outward. Author

N74-20767 Naval Air Systems Command, Washington, D.C.
HELICOPTER PERSONNEL SURVIVABILITY REQUIREMENTS
T. Stephen Meek *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 6 p ref

Current provisions for countering helicopter in-flight emergencies are discussed and their inadequacies are noted. To assess the need for improved helicopter occupant survivability, a review is presented of U. S. Navy, Marine Corps and Army helicopter fatal accident data. Analyses of these data have identified the survival mechanisms which could have prevented these fatalities. Practicable combinations of these survival mechanisms - (1) emergency in-flight egress, (2) improved crash impact protection, (3) improved fire protection and (4) improved flotation - could have averted more than 80 percent of the fatalities analyzed over a 17 year period. Author

N74-20768 Army Aeromedical Research Lab., Fort Rucker, Ala.
PARACHUTE ESCAPE FROM HELICOPTERS
William P. Schane *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 3 p refs

A series of parachute jumps were made from an autorotating helicopter. The exit and separation of the parachutist from the helicopter were documented by 16mm motion pictures taken at 32 frames per second with a motion picture camera and by 35mm slides taken four frames per second by a motorized Nikon camera. The photo platform was a chase helicopter flying precise formation with the jump helicopter. Data were obtained with frame by frame analysis of the motion pictures measuring the distance separating the parachutist from a reference point on the helicopter. The distance from the most anterior portion of the nose to the most posterior portion of the tail boom of the jump helicopter was used as a reference length. Approximate rates of descent of the jump helicopter during test were established using the vertical speed indicator aboard the jump helicopter. Precise rate of descent at the moment of parachutist exit was determined using a recording radar altimeter which provides precise altitude information above ground level. Author

N74-20769 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
HUMAN FACTORS ASPECTS OF IN-FLIGHT ESCAPE FROM HELICOPTERS
D. C. Reader *In* AGARD Escape Probl. and Manoeuvres in Combat Aircraft Feb. 1974 4 p refs

A review of the accident statistics from some helicopters users of the NATO forces has shown that helicopter operations impose a greater risk to their crews compared with fixed-wing aircraft. Cost analyses have shown that the crew cost more to replace than their aircraft. Thus, it is considered that a strong case exists for in-flight escape from helicopters. Some human factors to be considered when designing such a system are described. Human tolerance to acceleration, egress path requirements, center of gravity data, restraint and parachute requirements, blast, noise, fragmentation and toxic hazards, and vision and egress time requirements are discussed. Author

N74-20773# Army Personnel Research Committee, London (England).
THE EFFECT OF VISCOUS DAMPING ON HAND TREMOR
M. Waygood Med. Res. Council Jul. 1972 11 p refs
(APRC-72/CS-6; BR37716) Avail: NTIS HC $4.00

Power spectra of hand tremor were obtained from 12 operators of an electronic viscously damped control system. Analysis of the spectra indicate that tremor is unaffected by the application of a viscous load. The values of viscous resistance were in the range 0.0817 to 0.0163 gm. cm/deg. sec. These are small values intended for hand controls. Author (ESRO)

N74-20774# Forschungsinstitut fuer Anthropotechnik, Meckenheim (West Germany).
SIGNAL DETECTION THEORY (SDT) AS METHODOLOGICAL MEANS FOR HUMAN ENGINEERING TESTS [DIE SIGNALENTDECKUNGSTHEORIE (SDT) ALS METHODISCHES HILFSMITTEL FUER ANTHROPOTECHNISCHE UNTERSUCHUNGEN]
Hannelore Koethe May 1973 46 p refs In GERMAN; ENGLISH summary
(Anthro-Mitt-1/73) Avail: NTIS HC $5.50; Forschungsinst. Fuer Anthropotech., Meckenheim, West Ger. 6 DM

A survey of psychological scaling and classical threshold methods is given. Signal Detection Theory (SDT) offers theoretical explanations which overcome the problems of older psychophysical models. The introduction into the theoretical foundations of SDT is followed by a description of its methods. The applicability of SDT methods to anthropotechnical (human engineering) problems is described. Author (ESRO)

N74-20775# Forschungsinstitut fuer Anthropotechnik, Meckenheim (West Germany).
INVESTIGATIONS ON VALUE DISPLAYS ON SCREENS [UNTERSUCHUNGEN ZUR MESSWERTDARSTELLUNG AUF BILDSCHIRMEN]
E. Schubert Aug. 1973 96 p refs In GERMAN; ENGLISH summary
(FB-11) Avail: NTIS HC $8.00; Forschungsinst. Fuer Antrhropotech., Meckenheim, West Ger. 10 DM

Six different display systems (one analog, one digital and four hybrid displays) were compared as to their readability. Besides the display formats, the changing rate and the direction of change of the display value were varied. The introduction of the pointer velocity as an independent variable led to a suitable research method; a new dynamic procedure was developed and tested. Readability comparison for the various displays showed that hybrid displays are superior to the digital display, with the pure analog display showing the worst results. The effect of changing rate on reading performance was qualitatively the same for all examined displays; reading errors grew with increasing values for the rate of exchange. Author (ESRO)

N74-20776# Forschungsinstitut fuer Anthropotechnik, Meckenheim (West Germany).
MOTION PERCEPTION IN VEHICLE SIMULATORS [BEWEGUNGSWAHRNEHMUNG IN FAHRZEUGSIMULATOREN]
G. Tiesler Sep. 1973 97 p refs In GERMAN; ENGLISH summary
(FB-12) Avail: NTIS HC $8.00; Forschungsinst. fuer Anthropotech., Meckenheim, West Ger. 10 DM

A literature review on physiology of motion perception, as well as the resulting requirements for motion simulation is given. Several examples of simulators are used to point out the necessity of adapting capabilities to specific research and for training problems. The problem of interactions between visual and motion cues is demonstrated. Some examples out of biocybernetics illustrate the complex processing of cues in man.
Author (ESRO)

N74-20777# Defence Research Information Centre, Orpington (England).
VISUAL RANGE OF AN OBJECT IN THE ATMOSPHERE
M. Gazzi et al Jan. 1974 39 p refs Transl. into ENGLISH from Portata Visuale di un Oggetto Attraverso l'Atmosfera, IFA-STR-17, Ist. di Fis. dell'Atmosfera (Rome), Apr. 1972 38 p
(DRIC-Trans-3318; BR30636; IFA-SR-36) Avail: NTIS HC $5.00

The elementary principles forming the basis of vision in the atmosphere are presented and the requirement for mathematical models is noted. The factors on which vision of an object in the atmosphere depends are described. These include attenuation and light of the atmosphere and contrast threshold. Calculation of visual range is treated in detail. ESRO

N74-20778# Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
SEPARATION OF SIGNALS DUE TO ARTERIAL AND VENOUS BLOODFLOW, IN THE DOPPLER SYSTEM, THAT USES CONTINUOUS ULTRASOUND M.S. Thesis
W. P. Goes Jun. 1973 47 p refs
(TH-73-E-40; ISBN-90-6144-040-8) Avail: NTIS HC $5.50

The separation of arterial and venous bloodflow signals from a Doppler flowmeter using continuous ultrasound is discussed. The received signal may contain positive and negative frequency shifts; in many cases positive shifts can be related to arterial bloodflow and negative shifts to venous flow. The average frequency of the positive and negative spectra of the Doppler signal is determined, using a known technique. To make interpretation of the registrations easier a multiplicand, depending upon the ratio of the powers of positive and negative spectra, is added. ESRO

N74-20779# Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
A COMPARATIVE ANALYSIS OF SEVERAL MODELS OF THE VENTRICULAR DEPOLARISATION. INTRODUCTION OF A STRING MODEL
A. A. H. Damen Oct. 1973 59 p refs
(TH-73-E-41; ISBN-90-6144-041-6) Avail: NTIS HC $6.00

The familiar one dipole, multiple dipole, and multipole models of the electric heart action were tested on their suitability of simulating the field of double layers, which change in time. These double layers form part of a new model (string model) of the depolarization wave through the heart ventricles based on a gross physiological resemblance. The string model consists of two strings of dipoles that travel along the endocardium; the depolarization of the myocardium is represented by filters responding to the dipoles. If the well known models fail in a model-to-model test with the string model, it is to be expected that they also can not handle the more complex real situation. Furthermore, the string model itself may provide an expedient for tackling the so called direct and inverse problem of electrocardiography.
Author (ESRO)

N74-20780# European Space Research Organization, Paris (France).
CHANGES IN THE CIRCADIAN RHYTHM OF THE BODY TEMPERATURE AFTER TRANSMERIDIAN FLIGHTS
Joerg Mertens Feb. 1974 68 p refs Transl. into ENGLISH of Die Veraenderungen der Tagesperiodischen Schwankungen der Koerpertemp. nach Transmeridianen Fluegen, DLR-FB-73-01, DFVLR, 1973
(ESRO-TT-16; DLR-FB-73-01) Avail: NTIS HC $6.50, DFVLR Porz-Wahn: 21.40 DM

The oral body temperature of 12 pilots was measured at 2 hour intervals over 24 hour periods. In two test periods prior to the transmeridian flights the normal body temperature rhythm was established. Effects of a time displacement of eight hours were investigated by determining the body temperature after flights between Germany and U.S.A., the measurements taking place in each case on the first, third, fifth and eighth day after the flight. Desynchronization relative to the new local time was observed after flights in both directions, but the changes after the West-East were more pronounced than after the one in the opposite direction. The adaptation time after an East-West flight was five days, and after a West-East flight at least eight days. Large individual differences both in the degree of the changes and the duration of adaptation were noted. Author (ESRO)

N74-20781# European Space Research Organization, Paris (France).
THE CHANGE OF CIRCADIAN RHYTHMS OF PSYCHOMOTOR PERFORMANCE AFTER TRANSMERIDIAN FLIGHTS
Michael Bodanowitz Feb. 1974 52 p refs Transl. into ENGLISH of die Veraenderung Tagesperiodischer Schwankungen der Psychomotorischen Leistung Nach Transmeridianen Fluegen, DLR-FB-73-52, DFVLR, 1973
(ESRO-TT-17; DLR-FB-73-52) Avail: NTIS HC $5.75; Original report in GERMAN: DFVLR, Porz, West Ger. 15.30 DM

Psychomotor performance was studied in eight students at 3-hour intervals during periods of 24 hours before and after flights between Germany and the U.S.A. Two 24-hour preflight periods revealed the basic normal daily rhythm of the psychomotor performance. Effects of a 6-hour time shift were evaluated by determining the psychomotor performance on day 1, 3, 5, and 8 following the flights in each direction. A desynchronization with the local time was observed after flight in both directions. The changes were more pronounced and longer lasting after the west-east flight. The resynchronization time amounted to five days after the westward travel and to eight days after the eastward direction. Effects of a 6-hour time shift were evaluated by determining the psychomotor performance on day 1, 3, 5, and 8 following the flights in each direction. A desynchronization with the local time was observed after flight in both directions. The changes were more pronounced and longer lasting after the west-east flight. The resynchronization time amounted to five days after the westward travel and to eight days after the eastward direction. Author (ESRO)

N74-20782# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PHYSIOLOGICAL EFFECTS OF WEARING THE FIRE PROXIMITY SUIT ON CRASH TRUCK ALERT STATUS TO HOT-DRY AND HOT-HUMID ENVIRONMENTS Final Report
Abbott T. Kissen, James J. Gerding, and Kenneth A. Miles Nov. 1973 14 p
(AF Proj. 7222)
(AD-773828; AMRL-TR-73-82) Avail: NTIS CSCL 06/1

Tests were conducted in the All Weather Test Facility to determine the physiologic penalty of wearing the fire fighter's proximity suit for a 2-hour alert cycle in the crash truck. Hot-dry and hot-humid environments were produced in the chamber which duplicated the most severe thermal conditions anticipated at hot weather bases. Three subjects wearing the proximity suit (except for gloves and helmet) were exposed (twice each) to either the hot-dry or hot-wet environments for 2 hours. In half of the tests, the proximity suit coat was also eliminated from the clothing assembly. For the given hyperthermic conditions, the 2-hour exposure periods do not elicit physiologic responses or symptoms indicative of incipient heat exhaustion although significant physiological decrements were observed. For operational relevancy, where a rescue procedure could be called for toward the conclusion of the thermal stress period, the suggestion is made to continue this effort with a series of tests in which an exercise regimen is superimposed on the thermal stress exposure. Author (GRA)

N74-20783# School of Aerospace Medicine, Brooks AFB, Tex.
THE USAFSAM SPATIAL ORIENTATION TRAINER: BACKGROUND AND APPARATUS Final Report, Sep. 1972 - Jun. 1973
Patrick J. Dowd Dec. 1973 18 p refs
(AF Proj. 7930)
(AD-772694; SAM-TR-73-46) Avail: NTIS CSCL 05/9

A prototype trainer has been developed for use as an aid in indoctrinating USAF pilots with spatial disorientation problems. Its main asset is that the pilot can control the trainer in four axes while his performance is recorded for analysis. The common spatial disorienting illusions are described, and their specific demonstrating procedures on the SOT. Specifications and capabilities of the trainer are presented. This trainer would be an effective training aid as well as serving as a valuable research tool for further study in motion simulators for training, in vestibular research, and in problems concerned with spatial disorientation and motion sickness. Author (GRA)

N74-20784# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PRIMARY COMPONENTS OF SIMULATED AIR BAG NOISE AND THEIR RELATIVE EFFECTS ON HUMAN HEARING Final Report, Oct. 1972 - Mar. 1973
Henry C. Sommer and Charles W. Nixon Nov. 1973 22 p refs
(AD-773809; AMRL-TR-73-52) Avail: NTIS CSCL 13/12

The relative contributions to auditory temporary threshold shift (TTS) of the air bag vehicle volume displacement and of the high frequency noise burst associated with activation, air turbulence, unfolding, etc., of the system were investigated. Ten male university subjects with normal hearing were exposed to each of three conditions: (a) to a positive pressure pulse of 165 db peak pressure with a rise time of 65 ms and a duration of 960 msec; (b) to a high frequency noise burst in the 350 Hz-2 kHz band at 153 db rms with rise and fall times of 25 ms and a duration of 400 ms and (c) to a and b presented simultaneously. TTS was measured for 12 discrete frequencies ranging from 125 Hz to 12 kHz for each exposure condition. The high frequency noise burst produced the greatest amount of TTS. The positive pressure pulse produced no measurable changes in hearing levels. The two components occurring simultaneously resulted in less TTS than that produced by the noise burst alone. (Modified author abstract) GRA

N74-20785# Systems Technology, Inc., Hawthorne, Calif.
MANUAL CONTROL PERFORMANCE AND DYNAMIC RESPONSE DURING SINUSOIDAL VIBRATION Final Report, Jul. 1971 - Jun. 1972
R. Wade Allen, Henry R. Jex, and Raymond E. MagDaleno Oct. 1973 165 p refs
(Contract F33615-71-C-1487)
(AD-773844; STI-TR-1013-2; AMRL-TR-73-78) Avail: NTIS CSCL 05/8

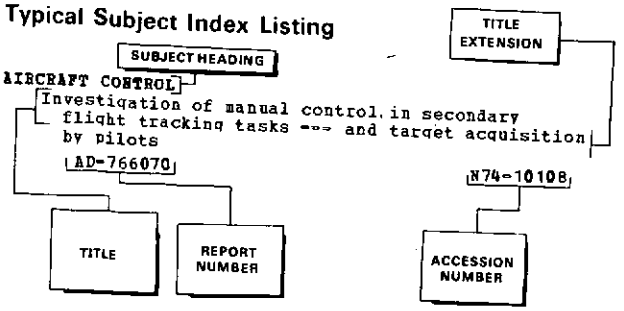
A variety of dynamic response and performance measurements are presented for compensatory manual control tasks performed under both vertical, lateral, and fore-aft sinusoidal vibration. Special, on-line measurement techniques allowed the partitioning of error and control response variances into portions correlated with the tracking task and vibration inputs, and an uncorrelated or remnant portion. Vibration effects on visual-motor response were generally subtle, and the most sensitive effects occurred in error remnant and vibration-induced feedthrough to the control response. Dramatic increases in remnant were obtained under low-frequency lateral vibration with a low spring gradient displacement stick, while an isometric control showed little effect. As part of the study, body motion and control response measurements were used to develop biomechanical models of the vibration-to-control feedthrough process. Under vertical vibration a simplified model, based on the operator's seat-to-shoulder transmissibility and a quasi-rigid arm linkage, was found to give an adequate description of vibration feedthrough. (Modified author abstract) GRA

N74-20786# General Electric Co., Lynn, Mass. Direct Energy Conversion Programs.
SELF-CONTAINED AIRCRAFT OXYGEN. VOLUME 4: UNDERWATER BREATHING MODIFICATION Final Technical Report, Aug. 71 - Aug. 72
John H. Russell and John W. Harrison Sep. 1973 101 p
(Contract F33657-68-C-1076)
(AD-774077; ASD-TR-73-240-Vol-4) Avail: NTIS CSCL 06/11

Adaptation of the self-contained aircraft oxygen system (SCAOS) for Navy use formed a part of the overall development program. The main difference between Navy and Air Force practice as it affects the system is the use of a chest-mounted miniature breathing regulator by the Navy, while the baseline Air Force system employs panel-mounted regulators occupying the envelope of the CRU-68/A regulator. A primary design consideration for Navy use is the capability of the system to operate in a submerged and flooded cockpit to a depth of 33 feet. The chest-mounted regulator allows the aviator to be in any orientation without materially affecting the mask pressure when underwater. The baseline SCAOS design uses an 1800 psi emergency oxygen supply (in addition to the bailout supply) to provide oxygen for 30 minutes at 30,000 feet in the event of a total system failure. This volume describes the design, development and testing of a T-39 configurated SCAOS system as modified for Navy use and the design of an emergency supply for 10 minutes operation underwater to a depth of 33 feet. (Modified author abstract) GRA

Subject Index

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

B

C

D

E

F

G

I

J

L

M

N

O

P

R

S

T

U

V

W

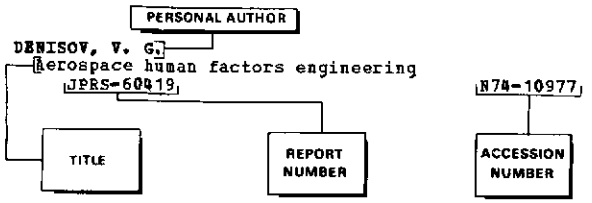
X

Y

Personal Author Index

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Suppl. 130)* JULY 1974

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W

Y

Z